

Mining

CONGRESS JOURNAL



MAY
1952



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Here's how to move ore across a river, 100 tons per hour, eliminating a four-mile truck haul. This Link-Belt belt conveyor, 700 ft. long, is mounted on a non-rigid suspension bridge. Vertical gravity-type take-ups keep belt at proper tension.

Why LINK-BELT belt conveyors are first choice in so many industries...

Engineering experience plus quality components combine to cut handling costs

EFFICIENCY in moving materials makes the difference between profit and loss in many operations. That's why it's so important to make sure you get the *right* belt conveyor system for your needs.

And there's no surer way of meeting your specific operating requirements than by calling in Link-Belt. Our belt conveyor specialists can efficiently engineer the system and recommend the correct components from Link-Belt's complete line of idlers, trippers and terminal machinery. And Link-Belt can match your needs in associated equipment—other types of conveyors, feeders, elevators, car dumpers and shakers.

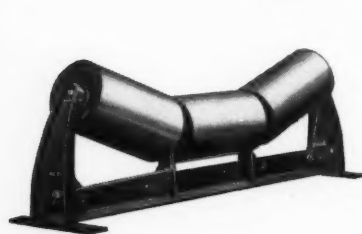
Equally important, with such a tremendous background in belt conveyor application, Link-Belt is in an ideal position to follow through on every detail of your job—from planning through erection, if desired. One source—one responsibility.

Link-Belt will gladly work with your engineers or consultants. There's a Link-Belt office in the principal city near you.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, Duluth 2, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices in Principal Cities. 12,720-A

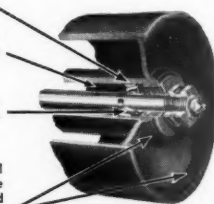
LINK-BELT BELT CONVEYOR EQUIPMENT

LINK-BELT Roller Bearing Idlers provide free-rolling, long life



Standard for Industry—L-B "100" Idler

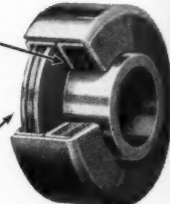
Grease-in-Dirt-out seal
Large grease reservoir prolongs lubrication intervals
Precision roller bearings maintain alignment
Full length central tube and roll shell are continuously welded to dished steel heads for uniform, perfectly balanced strength



Less lubrication and adjustment

No springs, no loose parts, no sliding metal-to-metal contact

Foreign matter can't penetrate labyrinth — lubricant preserved



Grease-in-Dirt-out Seal

You may have a production Bottleneck HERE!

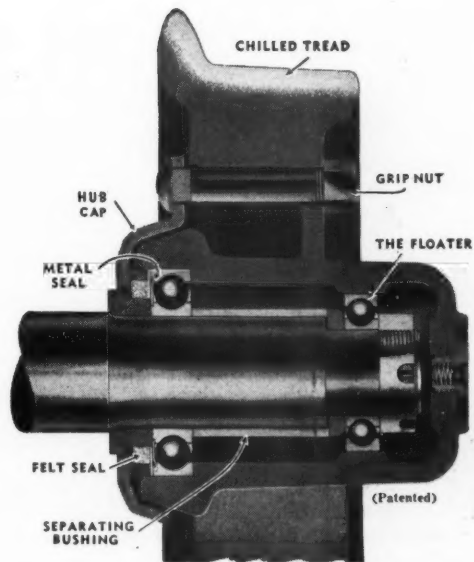


"Why didn't I discover that before!" How often this question pops up when suddenly you find a costly leak in maintenance. That's why we suggest you check your car wheel up-keep now. If you are not using S-D "Floater" Ball Bearing Wheels, your present wheels, unknowingly, may be a production bottleneck—retarding output by wasting grease, labor and power.

S-D "FLOATER" LUBRICATION SAVINGS . . . grease stays in the wheel, dust and dirt out because S-D "Floaters" have a solid closed front hub and back double seal.

S-D "FLOATERS" LABOR SAVINGS . . . any unskilled worker can remove a "Floater" wheel by unscrewing only three nuts. When wheel is off bearings always remain on axle in perfect adjustment.

S-D "FLOATER" POWER SAVINGS . . . independent engineering firm tests prove that locomotives can pull up to 50% greater loads when cars are equipped with S-D "Floaters" instead of other types of precision bearing wheels . . . a big power and time saver! For faster, cheaper hauling . . . for less maintenance . . . for longer wheel life — S-D "Floaters" are your best wheel buy! Write today for complete information. Sanford-Day Iron Works, Knoxville, Tenn.



SANFORD-DAY IRON WORKS

New American Tiger Brand gives 20% to 83% in

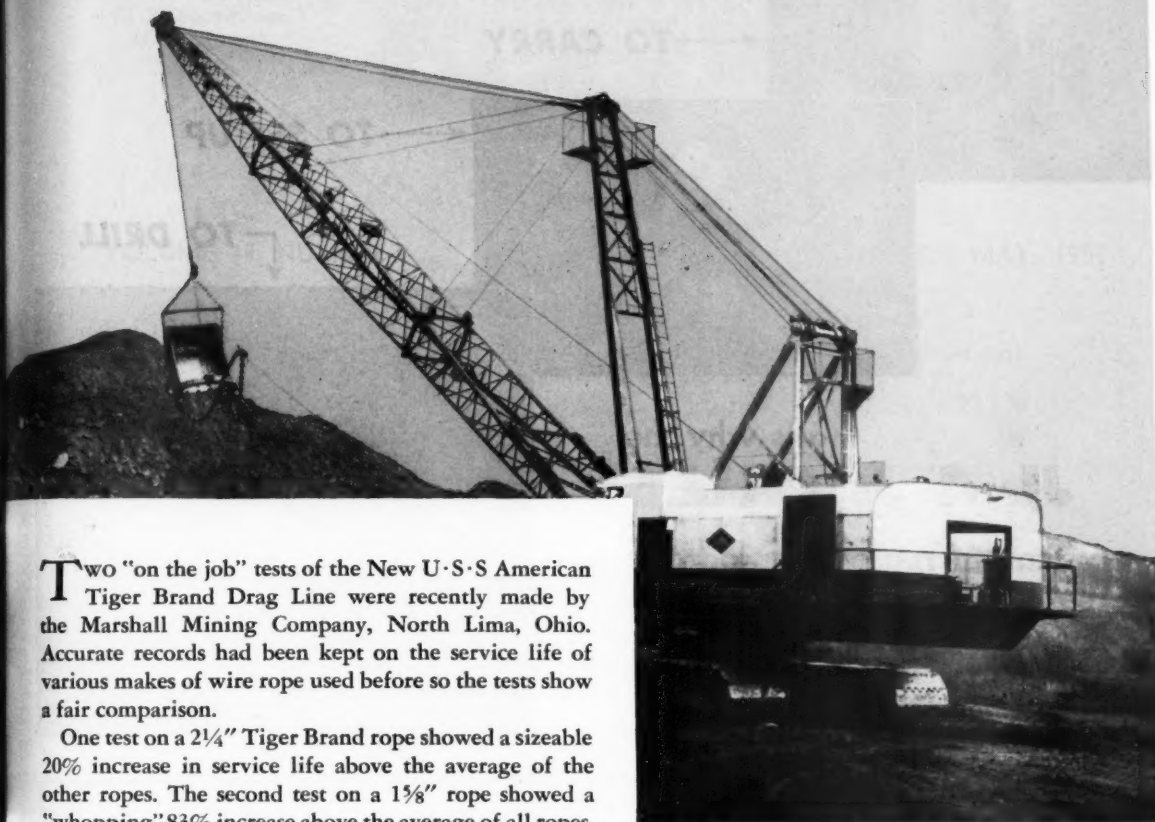


SAVES MONEY AND TIME—INCREASES PRODUCTION. This new Tiger Brand Drag Line Rope quickly pays for itself through increased life and greater production. Try it next time you have to replace your drag rope.

20% INCREASE IN WIRE ROPE LIFE. When this 14 cu. yd. drag line was equipped with the new Tiger Brand 2 1/4" Drag Line, the average service life of the rope was increased 20% over other brands tested.



er Brand Drag Line % increase in service life



Two "on the job" tests of the New U·S·S American Tiger Brand Drag Line were recently made by the Marshall Mining Company, North Lima, Ohio. Accurate records had been kept on the service life of various makes of wire rope used before so the tests show a fair comparison.

One test on a 2¼" Tiger Brand rope showed a sizeable 20% increase in service life above the average of the other ropes. The second test on a 1¾" rope showed a "whopping" 83% increase above the average of all ropes. Digging conditions in all cases were the same.

This new Tiger Brand Drag Line was designed especially to resist the severe operating conditions imposed by this class of service.

The use of this new rope on your drag line will mean substantial savings in your wire rope costs. It will cut your down time and help to keep machines at top capacity.

DRAG LINE LIFE INCREASED FROM 600 HOURS TO 1100 HOURS
—83%. The best service on this drag line using 1¾" rope averaged 600 hours for other brands of rope. But with the new U·S·S Tiger Brand Rope, service life jumped to 1100 hours—almost double the previous average.

U·S·S AMERICAN TIGER BRAND WIRE ROPE

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Excellay Preformed



UNITED STATES STEEL

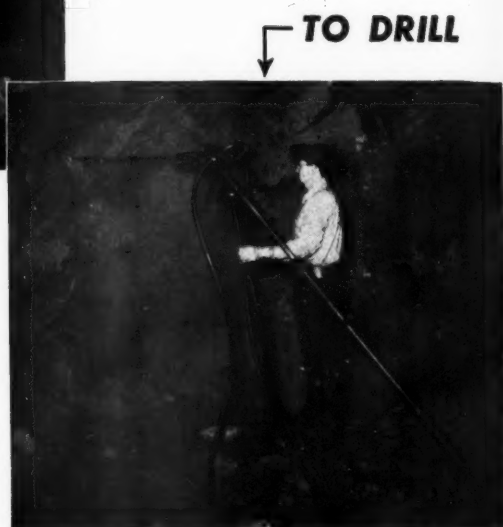
it's as quick and easy as it looks



← **TO CARRY**



← **TO SET UP**



↓ **TO DRILL**

that's why the **JL-4 JACKLEG**

can increase your footage
up to 50% or more

Take the JL-4 Jackleg into the smallest tunnel or tightest corner—set it up in an instant—collar the hole—and let the JL-4 do *all the work*. It supports the Jackhammer, absorbs the recoil, and feeds the drill uniformly into the rock.

Elimination of set-up time and faster drilling speed with smaller Carset Jackbits can increase footage as much as 50% in scam drifts, coyote holes, slashing in stopes, square set mining and sublevel work.

The new JL-4 embodies many new features for easier, more efficient operation. Feed legs up to 4' long plus extension pieces permit the use of longer steels—an improved pressure valve gives better control of feed rates—a finger-tip bleed-off valve gives instant pressure release—renewable clamping plates and a bayonet connection simplifies mounting the drill on the leg. The JL-4 is the result of 12 years experience in manufacturing and applying Jacklegs, in world-wide installations.

For complete information, see your nearest I-R representative. He is a skilled specialist in the application and servicing of every type of rock drilling equipment. He is backed by factory branch stocks and service in your vicinity.

This Complete I-R Combination
has **NO EQUAL** for fast,
efficient small-hole drilling

JL-4 JACKLEG
with
J-40 JACKHAMER
and
SERIES 113
CARSET JACKBITS

Comparative Tests—both in the factory and on the job—have proved that this I-R Jackleg Combination out-performs other equipment of its type in drilling speed. Air consumption and maintenance costs are exceptionally low.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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Point of Detonation ... Top or Bottom?

Machine-gun camera proves maximum confinement and minimum air blast achieved with millisecond delay detonators at bottom of the holes!



HERE, ORDINARY BLASTING was used with holes detonated from the top. The typical geysers of wasted gas mean a lot of explosives energy is dissipated in the air . . . is making noise instead of breaking rock. The wild-flying rock and spectacular smoke are sure signs of wasted power . . . power which could have been used to *break* rock.



BUT, HERE, ROCKMASTER® BLASTING was used with holes detonated from the *bottom*. Second photo shows the rock beginning to heave, with gas well confined. There's still no sign of escaping gas at the peak of blast, a full second after detonation.

See how ROCKMASTER can be put to work for you. Send for the free 20-page ROCKMASTER book showing typical loading patterns for all principal types of *controlled* blasting.

ATLAS EXPLOSIVES

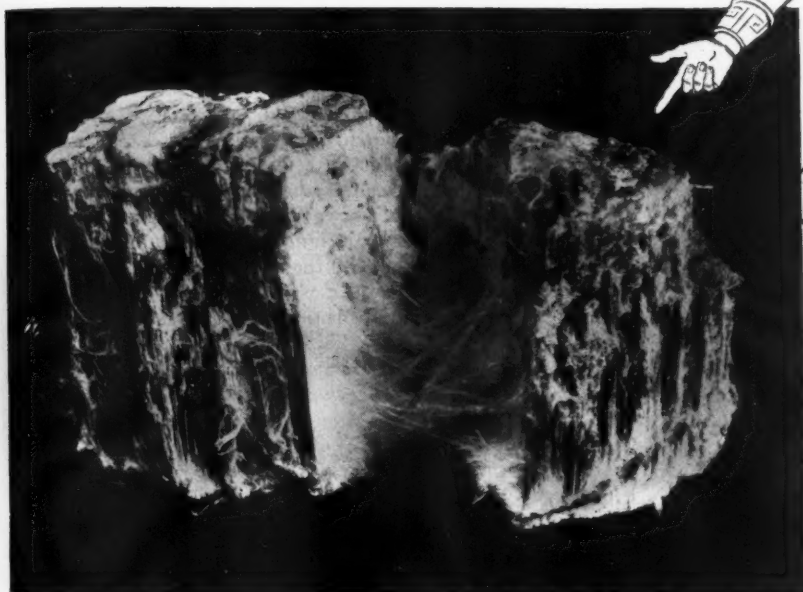


"Everything for Blasting"

ATLAS POWDER COMPANY • WILMINGTON 99, DELAWARE

Offices in principal cities

"Threads of Gold" for a ROMAN TOGA



The mineral *Chrysotile*, meaning golden fibers, or threads, supplies over 90% of the world's asbestos requirements. Called the "miracle mineral" by the ancients, the Roman naturalist Pliny (23-79 A.D.) refers to the use of such material as "a rare and costly cloth" used for the funeral garments of kings.

The secret of the great usefulness of asbestos lies in its unique combination of fibrous structure, fire and water resistance, flexibility and strength. Since the profitable recovery of asbestos fiber depends upon fine crushing without destroying fiber length, a crusher that will perform such functions economically, and will produce large quantities of finely crushed material, is essential.

Proof of the world-wide acceptance of "SYMONS" Cone Crushers in asbestos production is found in the field, where practically every major producer employs these high capacity, economical machines . . . as in all of the great ore and industrial mineral operations the world over.

NORDBERG MFG. CO., Milwaukee, Wisconsin



"SYMONS"
Primary
Crushers



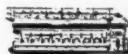
Grinding
Mills



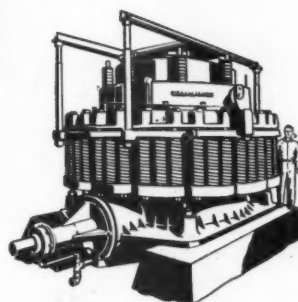
Mine Hoists



"SYMONS"
Vibrating Bar
Grizzlies and Screens



Diesel Engines



"SYMONS" Cone Crushers . . . the machines that revolutionized crushing practice . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to 900 tons per hour.

C252

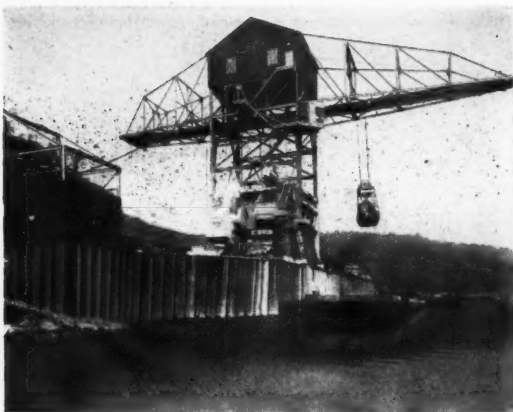
"SYMONS" . . . A NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD



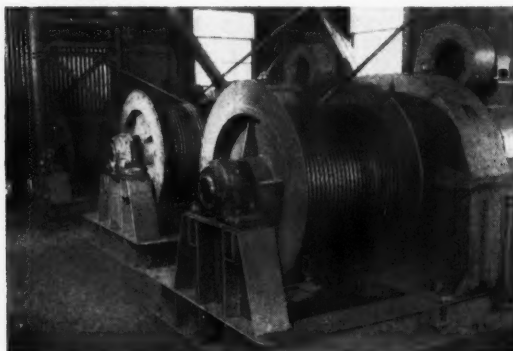
NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • SPOKANE • WASHINGTON • TORONTO
MEXICO, D. F. • LONDON • PARIS • JOHANNESBURG



This 720 ton-per-hour Barge Unloader . . . designed, fabricated and erected by Heyl & Patterson . . . was recently put into operation for the Duquesne Slag Co., Pittsburgh, Pa.



The Close Drum and the Hold Drum (right and center), which raise, lower, open and close the bucket, are operated by two 200 H.P. motors. The Trolley Drum (left) is operated by one 100 H.P. motor.



All motions of the Trolley and Bucket are easily controlled by a single operator.

ADVANCED DESIGN is the RESULT of COOPERATIVE PLANNING

by Heyl & Patterson

The improvement of Heavy Bulk Materials Handling Equipment for the world's major industries . . . Steel, Mining, Power, Transportation, Aluminum . . . calls for Engineers, Fabricators and Erectors instilled with the urge for constant improvements . . . improvements based on actual past experience and on modern thinking and planning . . . with the one thought of building better equipment.

Heyl & Patterson is fortunate in having men of this type . . . men who realize that improvements come only as the result of experimenting in the engineering department, in the research department and in the field.

Heyl & Patterson Engineers have to be specialists in Heavy Bulk Materials Handling Equipment because they have undivided responsibility for the successful operation of all H&P projects.

Complete cooperation for our design engineers is assured because we have **Our Own** Engineering Department . . . **Our Own** Research Department . . . **Our Own** Structural Shop . . . **Our Own** Machine Shop . . . **Our Own** Erection Department.

Every man on our Sales Staff is an experienced, practical engineer with a firm belief in the need of advanced design. Their first duty is to understand your problems. Then it is the duty of every member of the H&P organization to see that you get complete cooperation . . . all the Way, from the original design to the successful operation of your equipment.

Heyl & Patterson can guarantee **Controlled Low Cost** because every phase of any Heavy Bulk Materials Handling Equipment Job can be produced entirely within **Our Own** organization.

Ore Bridges
Railroad Car Dumpers
High Lift-Turnover-Rotary
Coal Preparation Plants
Coal & Coke Handling
Equipment

Boat Loaders and Unloaders
Rotary Mine Car Dumpers
Coal Crushers
Coal Storage Bridges
Car Hauls and Boat Movers

Bradford Breakers
Refuse Disposal Cars
Thorsten Coal
Sampling Systems
Kinney Car Unloaders

Pig Iron Casting Machines
Cyclone Thickeners
Thermal Dryers
The Drying Dutchman
Reineveld Centrifugal Dryer

Heyl + Patterson, Inc.

"SINCE 1887"

55 WATER STREET • PITTSBURGH 22, PA.

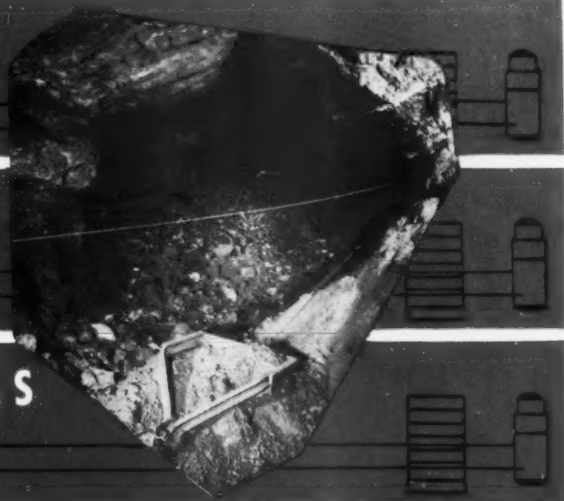
**Heavy Bulk Materials
Handling Equipment**

**All The Way from
Design to Erection**

SAVE MONEY

ON EVERY TRIP

YOUR SCRAPER MAKES



WITH THE GARDNER-DENVER

AIRSLUSHER



HERE'S HOW:

Steady power—for a full pay load every trip.

High speed—for more trips per shift.

No air-waste idling between trips.

Single throttle control—readily mastered by your new miners.

Three sizes—to fit your scraper capacity efficiently.

Write today for Bulletin AS-3 on Gardner-Denver Airlushers and Air Hoists.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada:

Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

**Powerful—Flexible
Single Drum Air Hoists**
Develop full speed and power in either direction. Compact and lightweight for easy moving about underground. Your choice of several sizes and rope capacities.



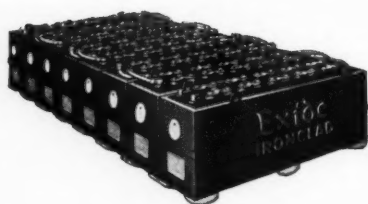
THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

ANNOUNCING

THE IMPROVED

Exide-Ironclad

BATTERY



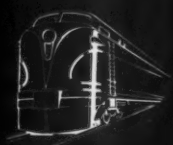
YEAR AFTER YEAR, one Exide-Ironclad improvement has followed another. It is a record of continuing progress... a steady flow of storage battery developments that have made Exide-Ironclad YOUR BEST POWER BUY AT ANY PRICE.

NOW COMES ANOTHER Exide-Ironclad advance... a polyethylene insulating tube sealer. This and other improvements combine to give you more dependable battery performance and longer-than-ever battery life.

Exide-Ironclad BATTERIES

YOUR BEST POWER BUY →

... AT ANY PRICE



BUILT TO GIVE YOU...

RAPID ACCURATE HANDLING . . . UNIFORM
RATE OF HANDLING . . . HIGH AVAILABILITY . . .
LOW OPERATING COSTS . . . LOW MAINTENANCE
COSTS . . . LOW DEPRECIATION COSTS . . . HIGH
MANEUVERABILITY . . . SAFE HANDLING

BECAUSE OF:

IMPROVED POSITIVE PLATE

CONSTRUCTION

the long-life grids now contain SILVIUM—an alloy of silver, lead and other components—which make them highly corrosion resistant. Top conducting bar is heavier.

... with the New Polyethylene insulating tube sealer

An insulating sealer for the bottom of the tubes. Acid-proof, non-corroding plastic it fits snugly into slotted tubes of positive plate, and reduces loss of active material. Even the small sediment deposit of the past is reduced 50%. Thus, more active material remains available, and the high battery capacity is sustained for longer working life. (See chart at right.)



PERMANIZED NEGATIVE PLATES

Improved processing, a result of Exide Quality Control assures uniform plates with higher electrical efficiency. These negatives, teamed with the improved positive plates, give you a well-balanced combination for hard service and long life.

NEW SEALING COMPOUND

Through the cooperative efforts of Exide Laboratories and the Franklin Institute, a new homogeneous compound was developed.

It makes a permanent seal between the jar and cover, resisting shock without cracking in high or low temperatures.

SEAMLESS SHOCK-PROOF JAR

Made of high quality rubber. A scientifically selected combination of tensile strength and elongation provides a sturdy jar built for long life and heavy-duty service.

CORROSION-RESISTANT TRAY GUARD

A plastic acid-resistant steel tray

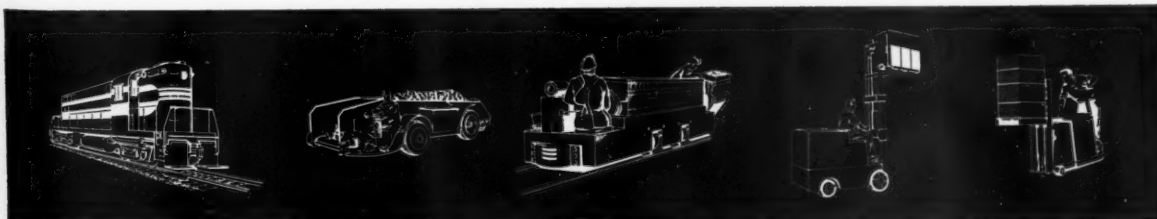
coating with high insulating quality and ability to withstand hard knocks.

NEW UNBREAKABLE PLASTIC VENT PLUGS

Made of unbreakable polyethylene. Can be quickly and easily removed to add water.

Types and sizes for storage battery applications for every heavy-duty service.

Write today for further information.



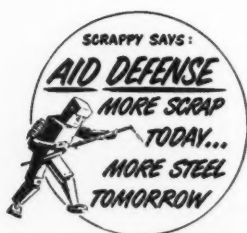
THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

"EXIDE-IRONCLAD" and "PERMANIZED" Reg. Trade-marks U.S. Pat. Off. "SILVIUM" T.M. Reg. applied for



Grandpa Never Threw a Thing Away



It's only human to want to hold on to things after they've outlived their usefulness. That's why today millions of tons of worn-out and obsolete equipment and machinery are lying forgotten in the country's plants and factories and on farms.

The steel industry needs these millions of tons of dormant scrap, needs

it in the worst way. With this vital dormant scrap the entire steel supply picture would brighten up, with more steel for everybody. But without it, the steel industry cannot hope to keep up production at present levels.

Call in a scrap dealer now, today. He will buy your dormant scrap and start it moving toward the steel mills.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

More Scrap Today... More Steel Tomorrow



Beats weather on tough lube job!

• Rain and snow washed the lubricant from the dipper stick and pinion gears . . . hot weather caused it to "melt" and run off. That meant that operators of this shovel used in a northern open pit mining project had to take time from every shift to apply new lubricant. The cost in operators' time and in lubricant was excessive. Dripping grease was untidy and unsafe.

Asked for his recommendations, a Standard Oil lubrication specialist suggested HD CAM AND GEAR LUBRICANT. The dipper stick and pinion gears were steam cleaned. The recommended lubricant was heated and brushed on in a smooth, even coating. HD CAM AND GEAR LUBRICANT has stayed on the job in all kinds of weather, and the lubrication period has been extended from a single shift to as long as two weeks. Dripping has been eliminated, lubrication costs have been cut.

HD CAM AND GEAR Lubricant

The experience of this mining company points the way to savings you can make through the use of Standard Oil's lubrication engineering service and high quality products. How you can easily and quickly put this lubrication service to work for you is explained at the right.

Standard Oil Company, (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.

STANDARD OIL COMPANY



(Indiana)

What's your problem?



C. F. Klenner, of Standard Oil's Duluth office, is the specialist who was called in by operators of this mine to help solve their lubrication problem. His practical experience and special training enabled him to recommend a lubricant that did the required job.

C. F. Klenner is one of a corps of Standard Oil lubrication specialists located throughout the Midwest. These men are especially trained to help you with your industrial or mining lubrication problems. To obtain the prompt, on-the-spot services of an experienced lubrication specialist, phone or write your local Standard Oil Company office.

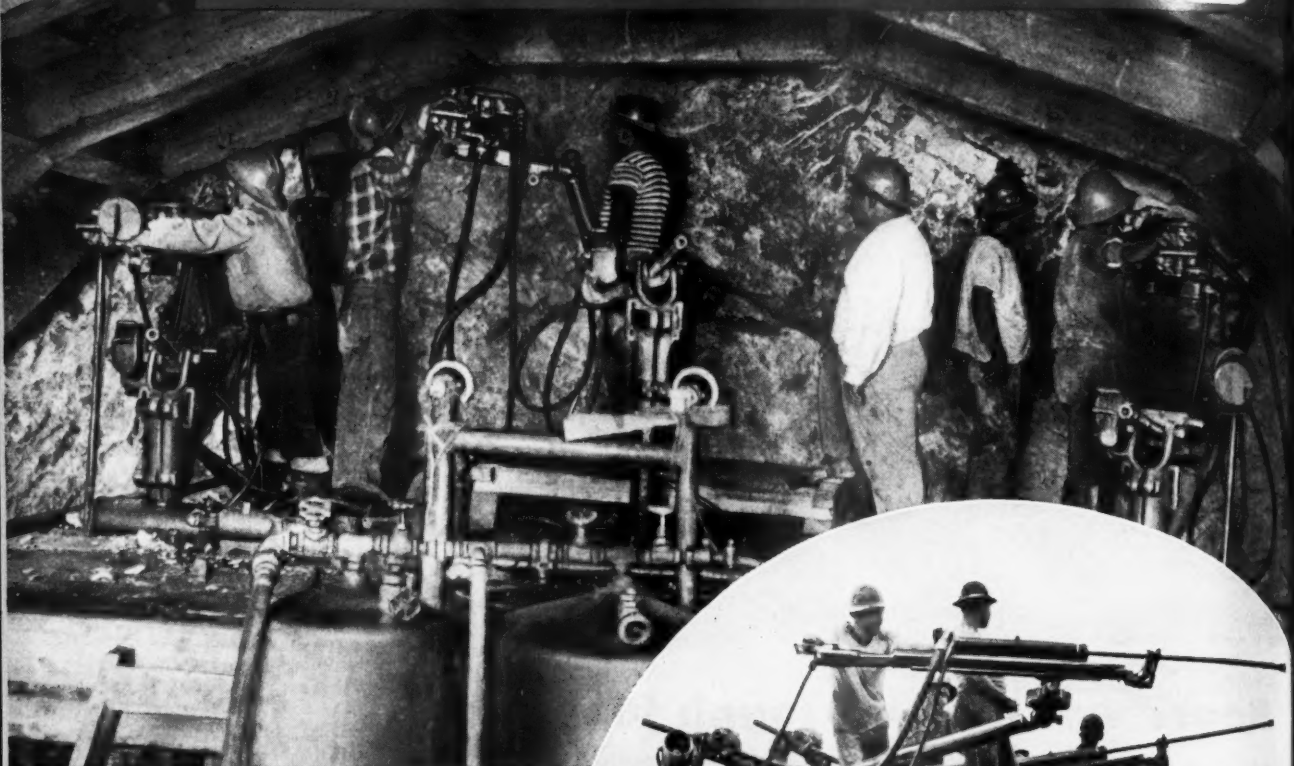
When the specialist calls, discuss with him the benefits offered by such products as:

STANOIL Industrial Oils—Simplify your lubrication jobs by using this one line of oils that provides cleaner operation of loader and crane hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems.

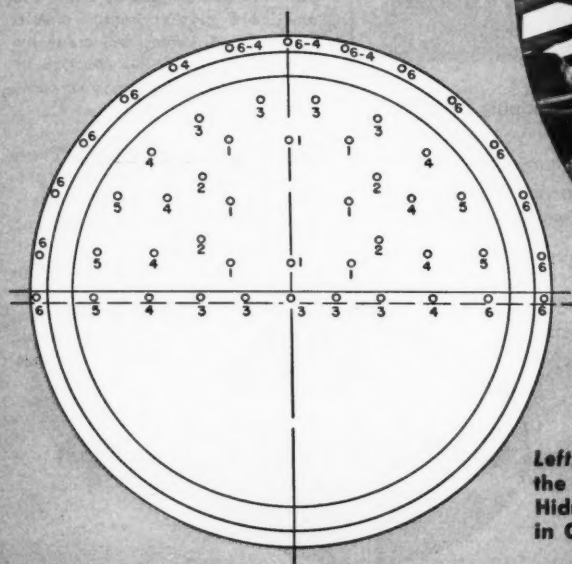
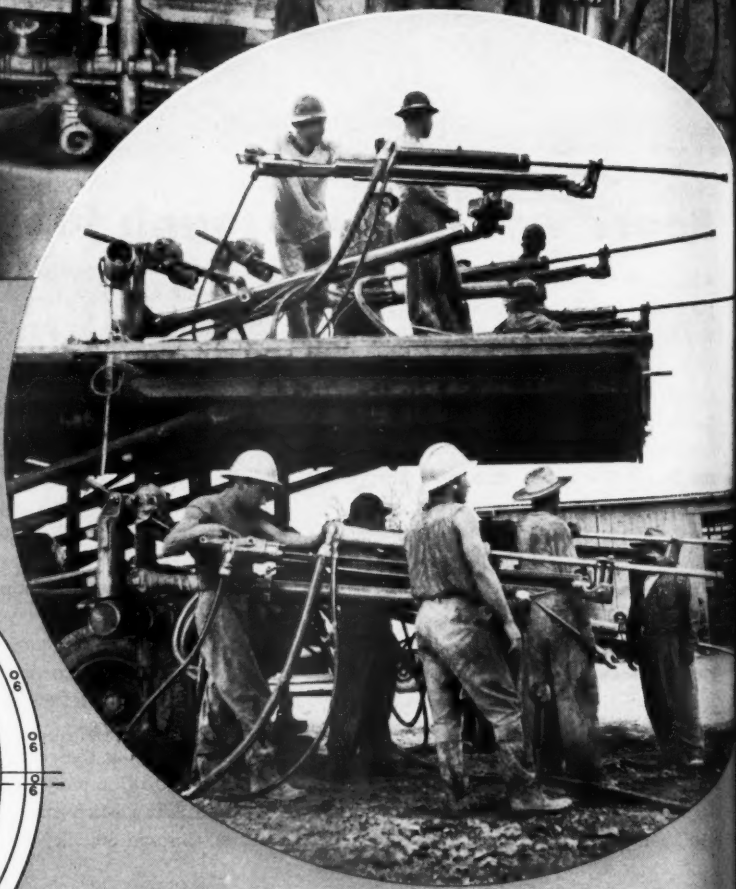
SUPERIA Mine Lubricants—These new, improved oils and greases provide better lubrication of cutters, loaders, locomotives, mine cars, and other underground equipment.

They eliminate transmission-case deposits, reduce clutch-plate gumming, and minimize wear on gears and bearings.

Tunneling



Right: Six-drill jumbo with Le Roi-CLEVELAND power feed drifters and air-motor booms on a 1½-ton truck. 1¼" round-lug steel and 2" carbide bits. Air supply — two 500 cfm compressors.



Left: Standard drill pattern for 50-hole round. Typical of the top-heading and bench method used by Construcciones Hidraulicas, S.A. in driving three 27'-bore circular tunnels in Obregon, Sonora, Mexico.

costs reduced!

with Le Roi-CLEVELAND Drifters and Jumbo Booms

**You spot your holes easier —
get less overbreak!**

**You get higher drilling speeds,
for faster cycles!**

Better fragmentation! More footage per shift! That's the pay-off, when you use Le Roi-CLEVELAND Jumbo Booms and power-feed Drifters in your rock headings. The pay-off that means lower costs on any rock-drilling or tunneling job.

- Le Roi-CLEVELAND Jumbos are versatile. Air-motor powered booms let you spot and space your holes quickly and easily for the most efficient fragmentation. Their greater flexibility lets you keep the tunnel bore close to pay line — with little overbreak or underbreak.

- Rigid, non-slip set-up feature of Le Roi-CLEVELAND Jumbo Booms keeps drifters in line, prevents steel binding, saves wear and tear on chucks.

- Strong rotation of Le Roi-CLEVELAND Drifters — plus snappy, powerful force of blow — give you unexcelled drilling speed. Graduated feed throttle lets you adjust pressure to get maximum footage in any type of rock formation. Fast feed travel makes steel-changing quick and easy.

Get more drilling done every shift. Save the money overbreak steals from you. Put the versatility of Le Roi-CLEVELAND Jumbo Booms and the dependable drilling speed of Le Roi-CLEVELAND Drifters to work for you. Write today for complete information.



LE ROI COMPANY

CLEVELAND ROCK DRILL DIVISION

12500 Berea Road, Cleveland 11, Ohio

Plants: Milwaukee, Cleveland and Greenwich, Ohio



The seamy rock in one tunnel at Obregon required 9 sections of timber every 3'. To save time on timbering, the contractors used the Le Roi-CLEVELAND air-motor powered jumbo booms to raise the sections of timber from the top deck of the jumbo to the roof.



Tunnel No. 1 at Obregon is 2411' long; tunnel No. 2, 1378'; tunnel No. 3, 1850'. Tunnel bores were so regular one observer said they must have been cut with a knife.



SHOWN ABOVE is part of the strip mining operations of DeBardeleben Coal Corp., Empire, Alabama. Here, overburden approximates 54' of sandstone and shale. Six-inch horizontal holes, spaced 18' apart, are drilled about 50' deep and in the operation pictured there were 29 such holes.

SPEEDS REMOVAL OF OVERBURDEN WITH DU PONT "NITRAMON"* in southern coal stripping operation



LOADING CREW places Du Pont "Nitramon" in one of the holes. "Nitramon" is the safest blasting agent known. In addition, it is packed in water-tight containers, may be loaded far in advance of shooting time, and is non-headache producing. It cannot be detonated with commercial blasting caps, or by fire, shock or friction. "Nitramon" Primers are used to detonate the charge.

DU PONT "NITRAMON"

A Product of Du Pont Explosives Research



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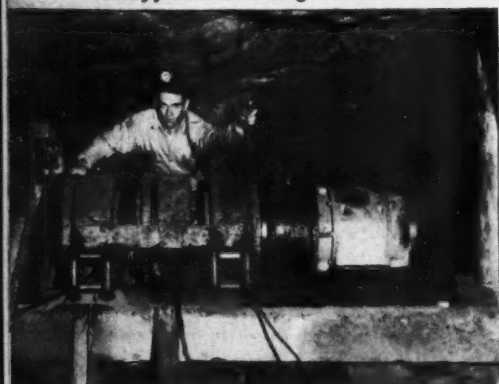
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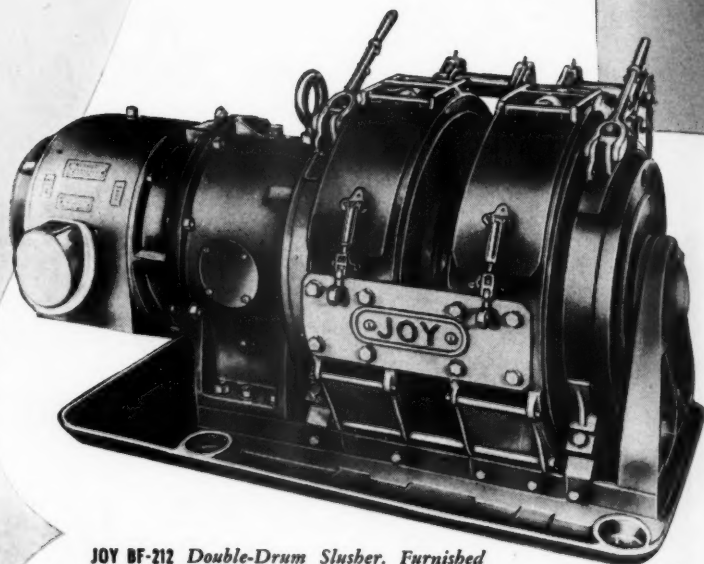
JOY AF-311 three-drum slusher in a large open stope in a western copper mine.



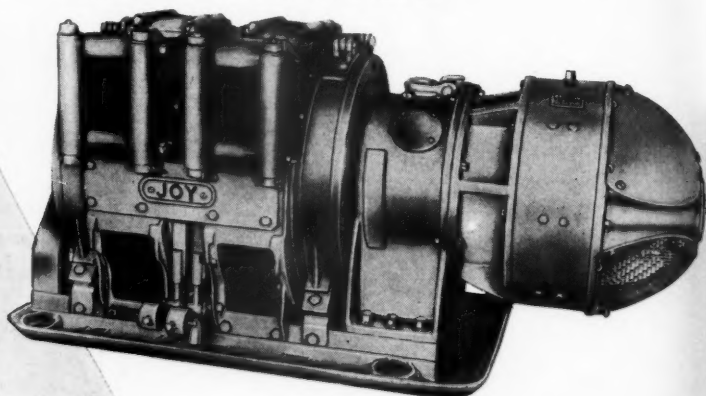
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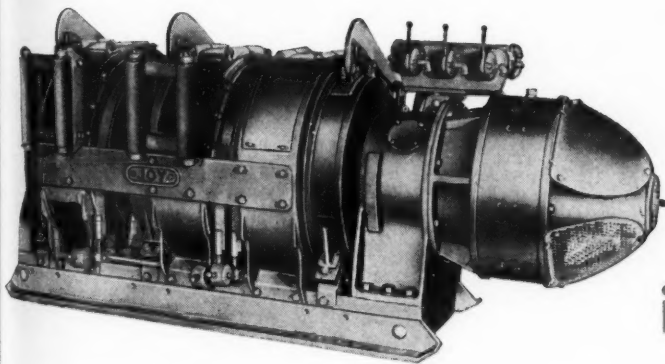
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March 10, 1952

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Sincerely,

L. I. Schott
L. I. Schott
Purchasing Agent

LIS J

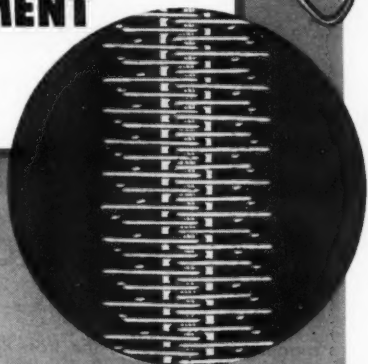
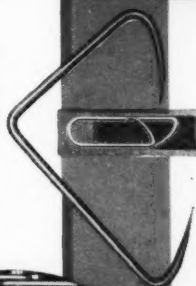
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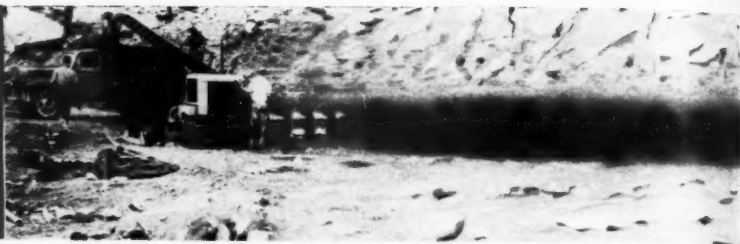
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We suggest you write today to determine which of four standard models is most suitable for your requirements.

McCarthy hydraulically controlled Drills are available with 4 to 24-ft. interlocking-auger sections in 20, 24, 30, 36, 42 and 48-inch diameters. Jacks are power operated with power supplied through gasoline, diesel or electric units.

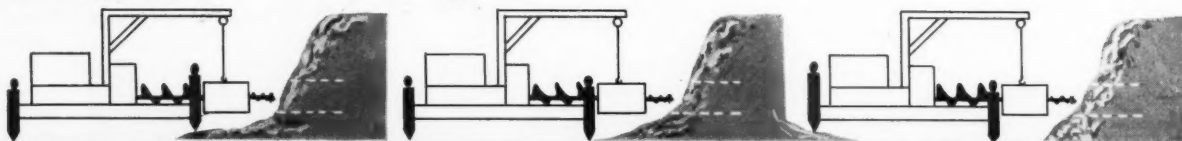
Make it a point to investigate this economical new method for recovering coal right now.



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✻ Editorials ✻

Volume 38

JOHN C. FOX, Editor

May, 1952

Eagle Beware!

ON April 8, 1952 the President of the United States seized virtually the entire steel industry, citing as his justification—"the authority vested in me by the Constitution and laws of the United States and as President of the United States and Commander-in-Chief of the armed forces of the United States. . . ."

The plain fact of the matter is that no such authority is granted to the President, either explicitly or implicitly, in the Constitution or in any law now in effect. This act was an unvarnished usurpation of absolute power—bringing this country one step closer to the Fascism and Nazism we thought we had vanquished at the end of World War II, and to the communism we are seeking to "contain" all over the world today.

There is far more here than the dispute between the steel companies and a labor union. Self-government through duly-elected representatives versus despotic rule by decree is the issue now at stake.

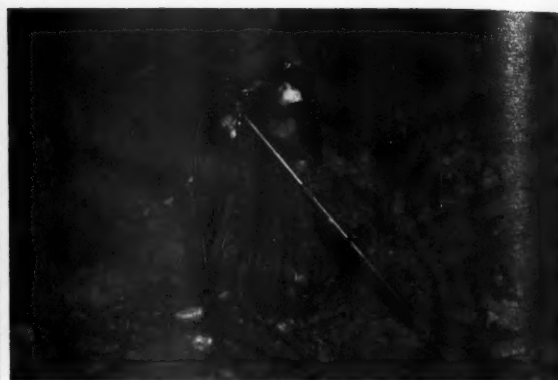
If this act of the Chief Executive is accepted then a precedent has been set for further steps along the road to state socialism. By this "authority" the President and Commander-in-Chief of the armed forces could also seize the press, wire services, radio and television, should he so desire. He could seize the farms and food processing plants. He could seize the mines and mills. He could seize the unions in whose behalf he ostensibly acted, and the public health services. In fact, he could control every act and almost every thought of 154,000,000 Americans. The edifice of tradition and the way of life that has stood as a beacon to oppressed peoples all over the world for more than 175 years would be washed away as completely as a child's sand castle on the seashore.

During the last two decades we have become accustomed to seeing government of the people, by

the people and for the people being whittled away piecemeal. A nibble here—taking away the rights of citizens to demand gold for their treasury certificates and to hold it; a nibble there—social security legislation, which imposes compulsory insurance on the people and atrophies the will to provide for the future. A big bite was the attempted packing of the Supreme Court; another gulp was the agricultural program, which has hamstrung the thinking of one of the most independent segments of our population and tied it to the apron strings of centralized government. Grants-in-aid to State governments have the effect of purchasing some of the rights expressly reserved to the several States by the Constitution. Ever-increasing income taxes have so nearly absorbed all venture capital that government subsidies in one form or another are sought to finance the search for new mines and the expansion of the mineral and other industries so vital to the nation's defense. Attempts to have War Emergency powers extended even after a state of war no longer exists and the assumption of the right to send United States troops to fight on foreign soil are other infringements on the rights of the people. Some of these bites were too big for even Big Government to digest. They have been disgorged—but something always stays down.

This latest grab is one of those that are too big. Congress and the courts of the land must see that it, too, is squeezed out of the craws of the vultures in eagle's plumage. But the people of America had better beware. We are marching right down the road to regimentation and ruin as the people of Europe have before us.

The true American Eagle is the symbol of freedom. He must never be lured down from the airy heights by promises of security—at the cost of clipped wings and a chain on his leg.



(Left) Type I—Direct Feed airleg cylinder is attached to drill, which moves with it. With type II—Reverse Feed airleg; (right) drill is attached to piston. Cylinder is stationary.

The Lightweight Air Leg Drill

Where and How This Versatile Drilling Tool Finds Its Place in The Mining Industry

By R. W. ADAMSON
Ingersoll-Rand Co.

THE adaptability of any rock drilling method depends upon many things: the skill, strength and physical characteristics of the available labor; the characteristics of the rock; the rate of production; mine conditions; the traditions of the district; the versatility of the management and many other factors. These elements inevitably boil down to the one basic factor, that of COST—not the cost per foot of blast hole drilled, but the cost of the final unit of production. In mining, this might be the cost of producing a pound of copper, lead or zinc; or of an ounce of gold.

Old rock drilling practices such as the "Finn Board," the "Mexican Set-up," and others, have a habit of appearing again combined with an important invention like the tungsten carbide bit. The resulting system is then heralded as a new one. Hence, rock drilling has its styles. Currently, air leg drilling is in style, and commands the attention and pointed interest of mine operators.

Essentially a stopper with a hinged joint, the air leg drill has wide application for drilling holes of horizontal or near horizontal inclination. It is a makeshift tool for drilling where the majority of the holes are of steep inclination. Prior to the development of tungsten carbide insert bits for rock drilling, the use of air leg drills was confined principally to softer formations. Since the development of small tungsten carbide insert bits, their use has expanded into hard rock

drilling applications not easily accessible to rigidly mounted machines.

There are two basic types of pneumatic feeds common to air leg drills,

and also common to stoppers. In the direct, or Type 1 Feed, the jackhammer is attached to the cylinder and moves with it. This is the conventional method of feeding a stopper. In the reverse, or Type 2 Feed, the drill is attached to the end of the piston rod and the cylinder remains stationary. This is the type of feed used with stoppers mounted on pneumatic columns and cone clamps. It is necessary to control feed cylinder pressure in both types. This is accomplished by throttling the supply of air to and from the feed cylinder through separate ports in the control valve.

The first type has a feature which at times is a disadvantage. The piston cannot be readily pulled up to move the machine forward in following a long steel change, however this type is widely used where plain breast holes predominate. Its simplicity, lower initial cost and low maintenance factor have made it popular in the anthracite coal fields, Colorado uranium fields and in the mines of the Marquette Iron Range. In 1948 it replaced tripod mounted drifter drills on the Marquette Range in the underground stopes of one large iron mine. The ore of this mine is hard specular hematite. Fifty-five pound jackhammers and 1½-in. tungsten carbide bits are used with direct feed air legs.

The original air leg drill built in 1938 was of the reverse feed, or stationary-cylinder construction. High maintenance caused by cuttings working from the drill hole down the piston rod of the leg and into the cylinder made it unpopular. This reverse feed unit was superseded by the direct feed. In 1949 manufacture of reverse feed type was resumed.

The reverse feed type is more versatile than the direct feed. It can be moved forward by its cylinder handle without worrying about the position



Versatile combination can be used for occasional vertical hole, but chuck is not adapted for prolonged up-hole drilling

of the feed piston. In addition to a graduated throttle control valve, it is equipped with a push-button air-release valve. The throttle valve is designed to give control of feed leg pressure in five-lb increments for each notch on the valve handle. Reverse feeds are manufactured in lengths of two, three and four ft, with cylinder bores of two in.

Extension legs of the same lengths are also available and frequently used. These are slipped on the cylinder tail piece to lengthen the leg and bring the angle of inclination of the leg down to practical working limits.

Progress in Design

Current improvements in design reduce the physical exertion required for operation. These improvements include the use of aluminum alloy tubing for cylinder construction and a newly designed mounting bracket for attaching the leg to the jackhammer.

The use of aluminum alloy tubing reduces the weight of the assembly approximately 18 lb, and has instant appeal to the operator. Extended rough field usage in Canada has demonstrated the practicability of aluminum alloy for this purpose. While aluminum alloys dent and scuff more easily than steel, a dent can be removed, and external scuffs do not affect the operating characteristics or the life of the cylinder.

Closer study of the method of attaching the air leg to a jackhammer revealed that a simpler, lighter and better balanced construction could be achieved by attaching the leg to brackets extending from the backhead out under the cylinder. This method

takes the strain off the side rods of the hammer and streamlines the assembly. It also improves the arm-cradling qualities when collaring holes.

Use Smaller, Faster Drill

The confusion which has surrounded the characteristics that a rock drill should have for use with tungsten carbide bits, has cleared somewhat as a result of improvements in bit quality. The trend to smaller drills and faster drill rotation speeds are two changes taking place as the result of using tungsten carbide insert bits.

Forty-five-lb jackhammers are most commonly used with air legs. Fifty-five-lb hammers are used where hole placements are simple and do not require fatiguing manipulation. Where operators are working under an incentive system, they often request the heavier machines. No significant difference in four-point bit life has been noted with the use of either class. However, the drilling speed of 55-lb machines is notably greater in the harder rocks.

Tests show that the drills in these two weight classes, including those of foreign manufacture, strike 2000 to 2200 blows per minute drilling in granite at 90 psi air pressure. Also, drills with positively thrown valves showed greater sustained efficiency than those with current thrown valves.

Standard rifle bar pitch has been speeded up from one in 40 to one in 30, for the 45- and 5-lb classes. This means that the pitch or spiral on the rifle bar makes one turn in 30 or 40 in. Increasing the rotation speed is logical, and has proved to be sound practice with small bits.

There has been considerable controversy over "up-stroke" and "down-stroke" rotation on drills used with tungsten carbide insert bits: whether the steel should be rotated by the return of the piston after striking the steel (up-stroke rotation), or whether it should be rotated on the stroke which engages the steel (down-stroke rotation). In harder rocks the standard up-stroke rotation is better with 45-lb machines. There is a broad range of friable, "ravelly" ores in which down-stroke rotation works better.

Some users report that down-stroke rotation with the 55-lb unit and tungsten carbide bits has been giving excellent results in hard rock as well as soft, when used with either air leg or hand-held sinkers.

The chuck of a jackhammer is subjected to greater strains and wear in air leg work than it is in the down hole work for which it was designed. Therefore, yoke-type steel holders with $\frac{7}{8}$ by $4\frac{1}{4}$ -in. hexagon shank chucks are used in the majority of air leg drills. There is reason to believe that still longer shanks could be used to advantage where the added weight is not objectionable. The $3\frac{3}{4}$ -in. chuck will soon be obsolete.

Hexagon steel predominates in air leg work, but there is a trend to the $\frac{7}{8}$ -in. quarter octagon section.

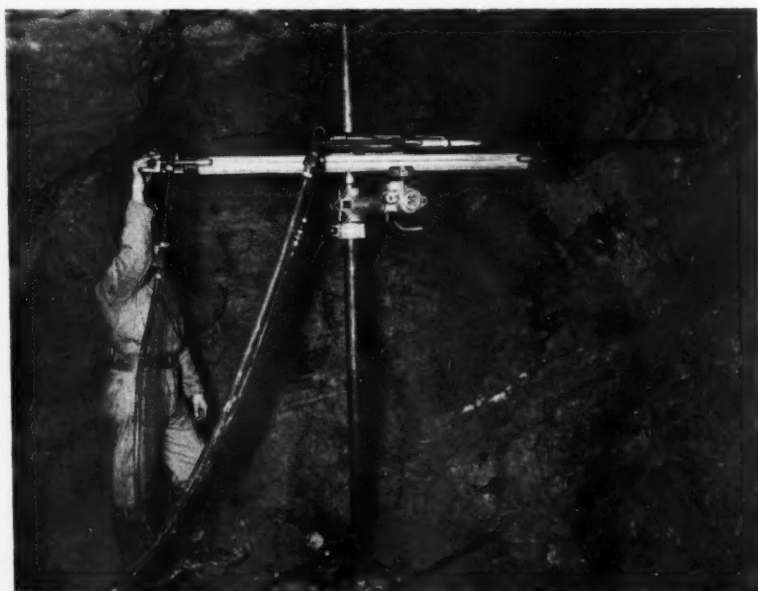
A jackhammer used with an air leg should have additional air admitted to the front end to keep the cuttings from entering the chuck. This is accomplished by passing live air from the valve chest through a port in the cylinder to the front end of the drill. This system has been standard with American manufacturers for years.

Small Diameter Bits Best

Success with air leg drills usually depends on a high rate of drilling speed. This is best obtained by using small-diameter, tungsten carbide-insert drill bits. Whether the tungsten carbide should be integral with the drill rod or detachable, and whether it should be two, three or four-point construction, are all controversial questions. However, several definite observations can be made. Larger mines with extended workings, show a distinct preference for the versatility of the detachable bit. Some of the smaller mines, particularly those without access to good drill rod shop facilities, prefer the integral construction, and are willing to scrap the drill steel when the tungsten carbide is worn out. The subject of bits and drill steel is a large one, and not within the scope of this paper.

Application Not Unlimited

The basic factor of cost must always be associated with its greatest component—labor. Any system or method of drilling which calls for



Light power feed drill on aluminum shells with pneumatic column weighs only half as much as heavy machine on screw column



Airleg drills are best used for slabbing in stopes where holes are close to horizontal and accurate placing is not needed

more than ordinary skill, coordination, or exertion will not find favor in American mining. These factors play a most important part in air leg drilling, especially when applied to large headings or in drilling "tough breaking" rock where accurate spacing of holes is most important. There are particular applications where an air leg can be used with a minimum of effort and acquired skill. However, it cannot equal the labor saving appeal of an automatically fed machine mounted on a mechanically manipulated boom or lightweight pneumatic column.

Snap judgment, too, often plays an important part in recommending the most economical method to do a rock drilling job. However, the more widely one observes rock drilling, the more cautious he becomes in arriving at firm conclusions. Let's take an example. This year four widely separated mines have been putting the spot light of investigation on their

drilling in square set stopes. The rock hardness in the four mines varied from moderately soft to hard. Most of the rock drilling equipment currently available, including air legs, was tested or investigated in each mine. The labor in all of the mines was on a contract or incentive basis.

In the first case, drilling in soft rock, conventional 98-lb. stopers were retained. All factors in final cost analysis showed they were better for the job than any other machine. A miner could "make room" for a set of timber by drilling five to seven holes in 20 to 30 min. Hole placement was satisfactory in the moderately soft rock and the work was not fatiguing to the operator.

In the second case, in medium hard ore, extended tests showed that 98-lb reverse feed stopers on pneumatic columns gave the best results. The miners were enthusiastic about using them and the final cost figures per ton were in favor of the reverse feed

stoppers. Prior to this three and 3½-in. conventional power feed drifters and screw columns were in use.

In the third case, also in medium hard ore, light power-fed drifters on aluminum alloy shells and pneumatic columns are scheduled to replace heavier drifters on the same pneumatic columns.

In the fourth case, with hard ore, air legs in conjunction with small diameter tungsten carbide detachable bits operated by husky and fairly experienced young miners showed a significant saving over 3½-in. drifters and steel bits.

The principal deductions which can be drawn from the above observations are: first, that conventional drifters mounted on screw columns have a doubtful future for square set stope mining and second, that lighter drilling equipment on light, quickly set up bars appeals to most mine workers. At the same time, management is satisfied with their use from a cost standpoint. Third, air legs with tungsten carbide insert bits are a valuable addition to rock drilling. Their chances of fitting into a stoping system should be carefully considered.

Based on observation of air leg drilling in many mines throughout this country, a few general conclusions as to their profitable application under present day conditions and in their present state of development, can be drawn.

They should be considered for stope drilling which calls mainly for slabbing holes that do not have to be accurately placed. Air legs are also ideal for drilling small development headings, slashing, trimming, drilling skip pockets and similar jobs. Air legs are excellent for small operations with limited working capital and resourceful workers who should have means of doing fast and varied rock drilling. Applications such as these are found in many American mining districts.



Airleg drill is easily dismantled and carried



Centrally located surface shops handle most major repair and rebuilding jobs

Maintenance in a Continuous Mining Operation

Planned Inspection and Care Vital to Uninterrupted Production

By G. W. STUMP

Assistant Production Manager
Rochester & Pittsburgh Coal Co.

THERE is an old adage which says "Look after the pennies and the dollars will look after themselves." This applies to continuous mining when the words are changed to: "Look after the maintenance of the machines and coal production will be at a maximum." The dream of any maintenance man is to have his machines operate 100 percent of the possible working time. How close this Utopia is approached depends entirely upon how well the maintenance program is planned and executed. The entire organization must be trained, from face men to top supervision, on the most efficient use of the machines, the importance of proper maintenance and the fallacy of abusing a machine. This is especially true of face supervisors whose prior training has been mostly on mining law, roof control and mining systems. These men must be educated in the principles of good maintenance and its necessity if high tonnage is to be produced. Every man must be a

maintenance man within his capabilities. One of the first steps in this educational program at R&P is to make time studies of the various operations to determine the most efficient way to use the machine with the least abuse. Studies are made of the time it takes for each type of repair job, and machine lubrication. This information is given to supervisory personnel to enable them to train their crews in the most efficient methods of operation, and to have plans made in advance, for work that the crews are to do when breakdowns occur.

Maintenance Difficulties

That no continuous machine is easy to maintain, is especially true in low coal seams. To stay within space limitations, these machines are very compact. The vital parts, such as hose lines, relief valves, control valves, pumps, control, motors, oil filters, gearing, etc., are in places underneath conveyor deckings because there is no

other space available. To a maintenance man, working with practically no head room, getting to these parts is a nightmare. In some cases it has been necessary to shoot top to get enough clearance to work on a machine. Along with this, continuous mining machines are still in the embryonic stage and there are inherent weaknesses yet to be discovered and corrected. There is still the problem of getting the coal away from the machine once it has been mined from the solid.

All of these things increase equipment down time and are reflected directly in produced tonnage. Equipment outage causes a higher loss of tonnage in continuous mining than in conventional mining since all productive work stops when a machine goes down, while with loading and cutting equipment, there is an opportunity to either prepare or load coal, depending on which unit is down. It is easy to understand why an outstanding maintenance program is imperative in the fight to keep equipment operating in a continuous mining system.

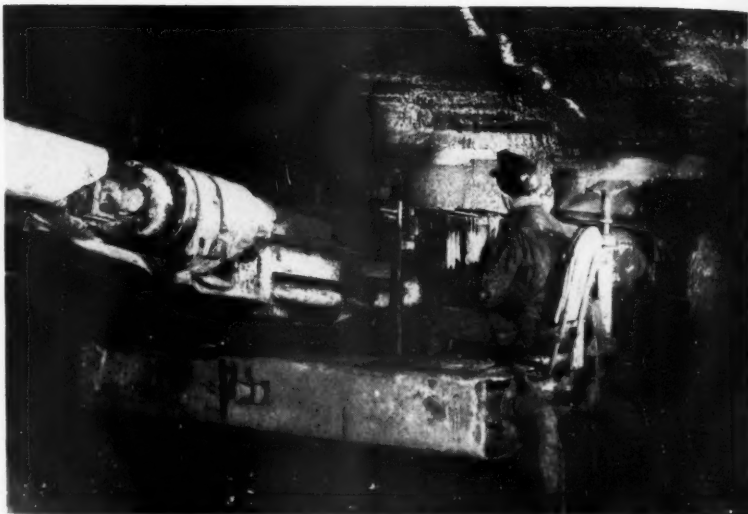
Rochester & Pittsburgh is operating continuous mining sections in the Upper and Lower Freeport coal seams, the Upper Freeport averaging about 41 in., and the Lower Freeport about 56 in. In a typical production set-up, haulage consists of a 30-in. belt, driven by a 50-hp motor, and four shuttle cars. Coal is mined by two continuous machines. The rooms using Joy Continuous Miners are on 25-ft centers while those driven by the Colmol are on 50-ft centers. Belts load into mine cars which are hauled to the surface

by locomotive. Belt heads are supplied with empties by a car spotter and flat road motors which allow car change without belt stoppage.

Operation in the thinner coal seam is beset with all the attendant ills of low coal plus a few problems peculiar to continuous mining. One of these is poor visibility at the immediate face because of water spray and dust. It is difficult to see the opposite side of the machine because its height leaves very little clearance over the top. Operators must depend a great deal on sound in controlling the machine to keep out of bottom or top. Small clearances and cramped working space makes visual inspection of the machinery more difficult; also, timbering is more difficult when it is necessary to use cross bars above the machine. All of these decrease production from the miner.

Extensive Organization Needed

Realizing the importance of good maintenance, Rochester & Pittsburgh has set up an organization which it is felt is adequate for the needs of a continuous system. A supervisor of maintenance is charged with the responsibility for all equipment at the mine, except in the tippie and cleaning plant. This man has had extensive and intensive training in maintenance. In some cases, although it is not a necessity, he is a graduate engineer. As part of his training, he has worked in all the company's various mines and shops to broaden his knowledge on all types of equipment. He has been sent to manufacturing plants to observe the assembling of equipment and has also spent time at the face. Under the supervisor is the chief electrician who is responsible for all underground equipment. He, also, has been given intensive training and instructions in special maintenance classes and has



Coal dust and water spray combine to limit visibility while machine is operating

watched the assembly of various machines at manufacturing companies.

Under the immediate direction of the chief electrician is a key or flat road man on each shift underground. These men are good mechanics who have been advanced to this position so that they may assist section mechanics with lesser experience. They also perform the mechanical and electrical inspection of the equipment. It is their job to expedite the repairs of equipment wherever required. In some instances these men are classed as shop foremen on a monthly basis; in other cases, they are key mechanics on a day rate. Section mechanics receive a great part of their training through these shop foremen and key mechanics. The outside shop has a shop foreman in charge who is responsible for repairs of equipment and assemblies sent outside.

Each producing unit has a mechanic who is under the direct supervision of the assistant foreman in charge of the section. These men are on day rate and ordinarily handle the repairs and routine work of the section. However, in the event of trouble beyond their ability or that of the assistant foreman, the latter will advise with the shop foreman, chief electrician or supervisor of maintenance as to what procedure to follow. The assistant foreman also has under his direction general men who lubricate and clean the belt lines. These men may work in several sections and are not attached to any one section.

In general, a new maintenance man is selected from the personnel of the mine. His training is begun by having him help the mechanic on various jobs as the opportunity affords and two men are required. After a period of time, he is asked to fill in for a shift when a regular mechanic is absent. In this manner, a number of men are being trained at the same time. These trainees also receive considerable help from the shop foremen and chief electrician. From time to time, maintenance courses are given at the mine and these men have the opportunity to attend and further their knowledge. The most likely are sent to the manufacturing plants of companies building the equipment to observe the assembly of machines. When an opening for a regular mechanic's job comes up, local management chooses the man from this group whom they feel is best fitted.

Shops Handle the Work

There is a centrally located machine shop to which repair work that cannot be handled by the mine shop is sent. Here organization consists of a shop superintendent, an electrical foreman and a mechanical foreman, office per-



Efficient maintenance program is prime requisite to full realization of machine's possibilities

sonnel and skilled workmen in every department. This shop is divided into three principal components; electrical, mechanical and rebuilding, and is tooled to handle almost any type of repair job sent in from the mine.

The electrical department rebuilds starting boxes, repairs and rebuilds all types of electric motors, rewinds armatures, repairs field coils and winds coils of certain types. They have facilities for dipping and baking repaired armatures. In the mechanical department, locomotive parts are turned out, pumps are repaired, cutter bars and heads for continuous miners built up, loading machine heads and tails rebuilt, crawler frames and main frames built up and machines, motor cases built up and rebored, etc. In the rebuilding department, locomotives, cutting machines, loading machines, drills, and shuttle cars are completely torn down and rebuilt.

Records Are Vital

In order to follow the performance of the machines, records are kept at the mine on each piece of equipment. These are set up in an individual book for each machine and show: (1) productive outage time, (2) nature of the delay, (3) tonnage produced, (4) percent outage of total productive time and (5) physical condition, type of operator and number of shifts worked. This information is gathered from the assistant foreman's daily report which also includes a report on belt inspection, and lubrication of the machines. It is very necessary when making a rebuilding plan as such rebuilding is based on an analysis on outage time, tons produced, conditions under which

the machine has been working, such as bottom water, top water, soft bottom rock, sulphur in the coal, single, double or triple shift, and the type of operators on the machine.

A recapitulation of the records is made weekly for use in following the performance of the machines. These show when a machine has had a major repair job in the outside shop and what was done. Records are kept in the central shop of all armature and motor repairs showing when the job was received, what was necessary to repair it and how long it had been in service. This gives an indication of what types of failures are occurring. The totals on each type of motor are recapped each month for the purpose of determining if failures are becoming excessive. The most important factor in gathering the information and keeping records as outlined above is to see that proper use is made of the results. The supervisor of maintenance and superintendent must study the reports and make sure their organizations are following up on what is shown.

Set Lubrication Procedures

In maintenance on a continuous mining section, first consideration is given to the lubrication of face equipment; that is the continuous machines and shuttle cars. There are certain points which must be lubricated or checked each shift, others daily, and still others weekly. To prevent a production delay, which would happen if all lubrication was done on one shift, the work is spread over three shifts. Each mechanic is assigned specific points to lubricate on his shift. He does the bulk of this during the 30-min down

time taken by the crew for lunch. Certain points such as the head drive gear cases must be checked at the beginning of the shift. This is done while the bits are being set.

Shuttle car lubrication is assigned over three shifts in the same manner, a mechanic being responsible for lubricating of a specific car. These are generally lubricated while dumping their loads with only a slight delay for lubricating those points which require stopping the car. The assistant foreman in the section is responsible for the proper lubrication of the specific machines assigned to his shift. He also enters on his daily report, the machines lubricated and the time of the shift at which it was done. This procedure of having a report made by the assistant may seem a bit elementary but experience has proved it necessary. Men are prone to neglect such things unless they are constantly reminded of them. The lubrication of the machines is checked by the chief electrician and supervisor of maintenance from the records and as they travel about the mine.

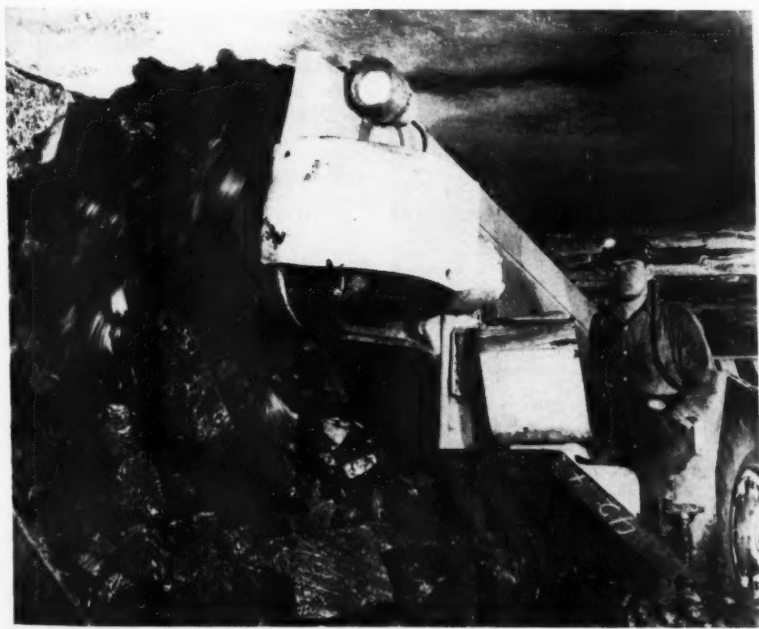
Periodic Checks The Rule

Mechanical and electrical inspections as required by law are made by the mechanics in the section. The equipment in the section is split up among the mechanics over the three shifts in the same manner as is the lubrication. A report of the inspection is made and is filed, after the chief electrician has checked it. Conditions not up to legal standards are corrected immediately.

An inspection of each piece of equipment is made monthly by a shop foreman, who makes two copies of his findings. One copy is left in the section for the assistant foreman, the other is given to the supervisor of maintenance. The assistant foreman has five days in which to correct substandard conditions on his equipment; at the end of this time the report with corresponding corrections is given to the supervisor of maintenance. If, for any reason, the assistant cannot correct the fault, he so states when returning the report. It is up to the chief electrician to follow through on these inspections and see that corrections are made. He must plan the repair work along with the assistant foreman so that the necessary repairs are made.

Belts are inspected for tears, rips, and bad splices each shift by the assistant foreman of the section. If serious damage is observed, repairs are made at once. This inspection is made at the end of the shift so that any damage or bad splices observed can be fixed during the down time between shifts. Thus down time is cut to a minimum. Belt drives and tail pieces are lubricated daily by belt greasers. Carrying and return idlers are lubri-

(Continued on page 45)



Mechanic on each of three shifts is responsible for lubrication of a specific "buggy"



Bolts were set in hole with 3½-in stopper



Tightening nut with impact wrench

Roof Support in Colorado

Mining Costs Reduced 20 Percent Through Use of Roof Bolts

By S. E. ZELENKOV

Superintendent
Kokomo Unit
American Smelting & Refining Co.

TODAY about 85 million square feet of roof, in 450 American soft coal mines, are bolted. Some of them are 100 percent roof-bolted.

An estimated 70,000,000 tons of coal were produced from mines using roof-bolting. This is roughly four tons of coal for each roof bolt. Here briefly are the advantages: increased safety; increased production averaging about 30 percent due to ease of installation; reduction of quantities of roof support materials to be handled; increased clearances in mine openings; improved ventilation; reduced maintenance of haulage ways; marked advantages in trackless mining by elimination of posts.

In metal mining, roof-bolting is extensively used in isolated instances only. However, the practice will become more widespread as the advantages are obvious. In addition to mine haulage ways and stopes, roof-bolting was applied in shaft sinking and in cutting of shaft stations. Others use it in shrinkage stopes to support hanging wall slabs.

Considerable pertinent information has been published such as U. S. Bureau of Mines Information Circulars 7471 and 7583, etc. The following is an account of actual experience at the Kokomo Unit:

Early Experience Successful

Roof-bolting was started in July, 1949, as an experiment. It was immediately so successful that it was used until the mine was worked out and shut down in 1950. The data given cover the period from July 1, 1949, to January 31, 1950.

Over 1000 bolts were used in all. They were tried in five stopes of which 8-M Stope was the largest, containing about 450 bolts. This was the downward extension of the old 800-ft level stope which was mined out down dip and completely caved in 1948. The roof bolting proceeded along with the mining until the area marked on the map "not pinned" was reached. In the northern half this "not pinned" area the ore was only 3 to 5 ft thick,







precluding the use of stopers for drilling the pin holes. The use of numerous timber cribs, standard hanging wall support, was resorted to in that area. Scattered cribs were installed in the pinned stope area, only as an indicative safety measure. These cribs showed no weight and several of them were taken down and moved to other locations as mining advanced. When the stope started to cave in the "not pinned" area, additional cribs were quickly installed to protect the remaining faces of ore. However, this would not have been necessary as the caving stopped in the pinned area.

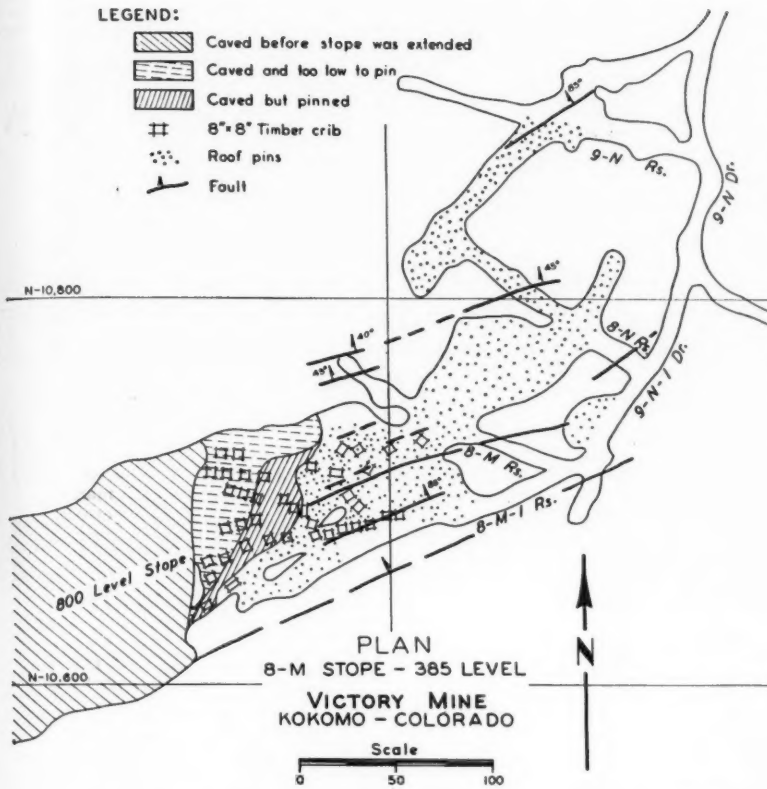
Weak Hanging-Wall Strata

Characteristics of the hanging wall were of great importance in mining the flat dipping ore bodies where approximately one sq ft of hanging wall was exposed for each ton of ore taken out.

The hanging wall was structurally weak interbedded sandstones, shales and silt stones. A few inches to a foot of faulted shale occurred immediately above the ore. For all practical purposes this faulted shale could not be supported either by timbering or roof pinning. It came down when the ore was blasted and large pieces were sorted out. Roof pins, placed right at the ore face in an effort to hold this faulted shale, held up only an inverted cone of the material after the ore was blasted and did not accomplish any useful purpose.

LEGEND:

-  Caved before slope was extended
-  Caved and too low to pin
-  Caved but pinned
-  8" x 8" Timber crib
-  Roof pins
-  Fault



Roof bolting proceeded along with mining until area not marked pinned was reached

The hanging wall had to be supported throughout the entire area. Unsupported, it broke, usually along some small fracture. The caving then proceeded over a larger area until the expansion of the broken material filled the hole.

There was no definite layer in which it would be advantageous to anchor the bolts, but, by placing them near the fractures, the falling out of small "Keystone" sections of hanging wall was prevented, and the individual beds were spliced together to form a laminated member six ft thick that was capable of supporting itself over great areas.

The bolts were made of one-in. diam round mild steel purchased in 20-ft lengths, which were cut in three equal parts, threaded and slit at the mine. A simple jig was made to guide the cutting torch when slitting the ends of bolts and cutting wedges. The wedges were made by cutting a six-in. piece of $\frac{3}{8}$ by $\frac{3}{8}$ -in. bar diagonally. Bearing plates were cut from scrap $\frac{3}{8}$ -in. plate. The plates were in the shape of equilateral triangles with eight-in. sides, dished to obtain a tripod bearing effect when the usual uneven roof surface was supported. Complete roof bolt assemblies are now available at all large steel fabricators, some of whom claim 20 percent of their tonnage production is roof bolts.

The one-in. round rods were chosen to fit the smallest size hole that could be drilled with our standard equipment and, in practice, seemed suited to our conditions. The procedure was to drill most of the hole with regular steel and to finish the last foot or two with integral forged steel having tungsten carbide inserts of $1\frac{1}{4}$ -in. gauge.

The roof bolts were installed on contract basis at \$1 per bolt. It was found that two men can install 20 to 25 bolts per eight hr shift. After the hole was drilled to a required depth the wedge was inserted in the bolt, a nut was placed on the other end and the assembly was driven in with a $3\frac{1}{2}$ -in. diameter piston stopper. The nuts were tightened with an Ingersoll-Rand size 534 impact wrench.

It is interesting to note that the U. S. Bureau of Mines recommends the initial tightening of the nuts between 275 to 300 ft-lbs for one-in. size rods. A considerable number of pins tested by them with a torque wrench at Kokomo were found to be tightened to about these figures.

Bolts Cheaper Than Timber

In view of the limited scope of our roof-bolting test, the bolts were made up at the mine at an overall cost of some \$1.50 per one-in. dia bolt, 6 by 8 in. long, complete with wedge nut and plate. A substantial saving may be effected if large quantities of commercially fabricated bolts are purchased. The test of patented bolt anchors now appearing on the market is also definitely warranted.

Disregarding the few cribs installed in the 8-M stope as an additional precaution, and then taking the installed cost of \$2.50 per bolt, the cost of the roof bolting was \$0.135 per ton of ore mined. This is only 25 percent of the cost of timber alone used in the rest of the stopes for roof support, not taking into account the higher cost of timber installation.

Caved in Orderly Fashion

It is estimated that 90 percent of the bolts installed were successful. The balance did not hold due to soft strata at the wedge end caving the hole or due to our test attempts to



Timber supports gave under pressure but roof bolts installed later held ground

hold up a layer of faulted and sheared shale immediately above the ore, as previously mentioned.

The area adjoining the cave in the 8-M stope was stoped by roof bolts. One of the bolts found at the edge of the cave was pulled in two by an estimated load of some 20 tons. The other half of the bolt was still firmly anchored in the back, proving the tensile strength of the rod was the limiting factor.

No attempt was made to use shorter bolts, say 5-ft, in view of the fact that it was not a question of reaching certain firm strata, but an effort to splice various beddings together. Unquestionably, in stopes of smaller area or in drifts and cross-cuts, shorter bolts will work.

According to U. S. B. M. officials a peculiar singing noise would be heard when excessive loads were applied to the roof bolts. No such warning was observed. It might be an advantage to install a recording microphone in a roof-bolted stope as a means of warning. The first indication that the roof loads were approaching a breaking point was the appearance of water drips from numerous and scattered bolt holes, indicating an accumulating storage and pressure of water in upper strata. This usually occurred about two weeks before the actual caving started and shortly after the last pillar next to the old cave

STOPE AVERAGES, JULY 1, 1949 THROUGH JANUARY 31, 1950				
Stope	Type of Support	*Manshifts	†Total Tons	Tons/M.S.
11-N	Roof Bolts	92½	1,496	16.17
8-M	Roof Bolts	607	8,513	14.02
6-M	Sets	148	1,925	13.01
5-L	Sets and Cribbs	470	5,830	12.40
4-K	Sets and Cribbs	464½	5,626	12.11
4-O	Sets and Cribbs	856½	9,798	11.44
3-L	Sets and Cribbs	387	4,135	10.68
3-M	Sets and Cribbs	528	5,564	10.54
4-M	Sets and Cribbs	567½	5,812	10.24
5-I & 800-L	Sets and Cribbs	1,160	10,786	9.30
6-O-Wz	Sets and Cribbs	413	3,767	9.12
Totals & Averages		5,694	63,252	11.11

* Total of all man-shifts in stope. Include procuring timber, timbering, installation of air and water lines, transporting equipment, etc. Development shifts also included.
† Total tons delivered into the mine cars.

was removed. At that time the timber cribs did not show any weight. The numerous cribs next to the old cave, most of them filled with sorted waste, offered but little resistance to the cave. After the unpinned portion of the pinned area caved completely and at once, a small adjoining portion of the pinned area caved slowly, in more orderly fashion—each successive bolt failing with a loud thud.

Mining Costs Reduced

The opportunity to observe the action of the roof bolts under excessive loads, such as were in effect in 8-M stope, resulted in a strong conviction that roof-bolting is applicable to many cases of hanging wall support.

Eleven-N stope 90 ft long by 30 ft wide was pinned and still stood up well when the mine was closed down some six months after it was mined out. The ground conditions there were such that difficulty would have been experienced in holding the hanging wall up with ordinary timber sets. There was little doubt that the 11-N stope would have caved if timber sets or stulls had been used.

Further evidence of the advantages of roof-bolting is shown by a tabulation giving the production figures in the main Kokomo stopes for seven months. The overall per man shift production for the same period was 5.70 tons; this included all men on the payroll—surface and underground labor and supervision. The high per man shift stope production attained was most significant in view of the fact that the output from the 8-M stope was restricted much of the time to comply with total monthly rate of 9,000 tons set for the whole mine. With pin-timbering and drilling with light jackhammer, air-leg, and tungsten-carbide bits in 8-M stope, contract price of mining was reduced some 20 percent.

Far better safety conditions were indicated in roof-bolted stopes. No lost time accidents were recorded for over 15,000 tons mined.

Decrease of dilution from hanging wall caving is also of importance.



Roof bolts were successful right to edge of caved ground

The Complete Report of the COAL CONVENTION

Including abstracts of all papers
will appear in the
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Make Bulldozer Permissible For Mine Service

Taking a bulldozer underground has taken a load off the cleaning plant and enabled a reduction in loading costs at this West Virginia property

AN electrically driven bulldozer has been in underground service for three years, preparing road beds, in a mine of Eastern Gas and Fuel Associates. Mine officials are full of praise for the unit and believe that, to coin a phrase, the electric bulldozer "is here to stay." That the machine is practical is proven by the length of service of the unit in this mine.

The mine is in a seam which consists of several benches of coal separated by partings of varying thickness. The particular area being worked now consists of, from the bottom up, 14 in. of coal, nine in. of fire clay, 48 in. of coal, from one to four ft of slaty shale with an average of three ft of coal overlaying the shale.

Roof is Bad

Only the lower two benches of coal are being mined. The overlying slate cannot be held for long distances and poses a problem in disposal. To shoot it down with the coal would complicate cleaning plant problems and to load it out separately would be too costly. Stowing it in the mine seemed the most likely alternative and a practical method had to be designed to accomplish this.

The success of any such plan hinged on an efficient method of rock handling underground and after much thought by mine officials the idea was evolved of replacing the diesel engine in a bulldozer with an electric motor. Manufacturers of crawler mounted tractors were contacted in an effort to find whether it was possible to purchase a bulldozer with electric drive. Finding no such machine available, the coal company officials took stock of their equipment and decided to mount a 50 hp, dc motor in a tractor already on the property. The experiment was a success and the reconstructed 'dozer is now used extensively underground.

In development work the face is advanced 400-500 ft with mobile equipment and the shale supported with 6-in. by 8-in. by 14-ft timbers on three to four-ft centers. After the coal is removed the mining equipment is moved to another section and the timber pulled. Most of the shale comes down of its own weight, although some has to be shot. The electric

bulldozer is then used to level the broken rock to a uniform grade preparatory to extending track, belting or shuttle car roads. The cleats on the tractor treads break the rock up and pack it down while excess material and large pieces (some as large as an office desk) are pushed into breakthroughs. Such material is seldom moved more than the distance between breakthroughs, 80 ft, although material can be moved farther than this when it is necessary to fill in a depression. Sometimes it is also necessary to shoot down some of the coal roof to get the minimum clearance of six ft

above top of rail. Swags, or low places, are built up to grade. When this has been done, the excess coal is loaded out.

Work Done in Mine Shop

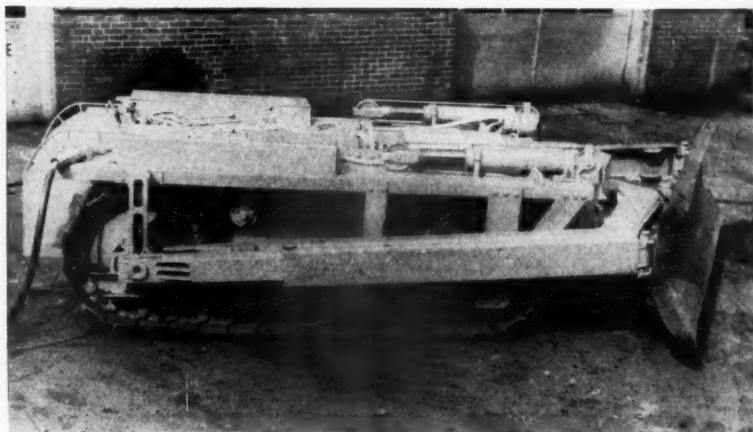
As was mentioned before, the actual work of transforming the diesel powered bulldozer to an electrically driven piece of equipment was done on the premises.

Parts that were removed:

- (1) Diesel motor, controls and handles
- (2) Radiator and accessories
- (3) Hydraulic pump, hose and connections
- (4) Fuel tank, gasoline tank and piping
- (5) Engine clutch lever
- (6) Gear shift lever
- (7) Brake pedals
- (8) Steering clutch lever
- (9) Seat and fenders
- (10) Hoist cylinder, assemblies and cradles



(Above) Before conversion the bulldozer had a height of 73½ in. Now the overall height is 48 in. (Below)





All movement is controlled by hand

- (11) Rocker arms, shafts and connections
- (12) Rocker arm and hoist cylinder frame

Parts that were added to complete the conversion were:

- (1) 1 50 hp, dc motor, controls and wiring
- (2) 1 Hydraulic pump
- (3) 2 Hydraulic jacks
- (4) 1 Control valve
- (5) 2 Steering cylinder assemblies
- (6) 300 ft, 3 conductor, No. 1 trailing cable
- (7) Channel frame and braces
- (8) Operator's deck and seat
- (9) Hydraulic hose, lever extensions, motor mountings, etc.
- (10) Electric headlights

Power is furnished from the mine supply through a 300-ft, three-conductor, No. 1 wire trailing cable. Overall height of the electric machine is 48 in.

compared to a height of 73½ in. for the diesel machine (including exhaust pipe). Hydraulic fluid is furnished from a 24-gal tank which has replaced the radiator of the original engine. The turning radius is the same, 90 in.

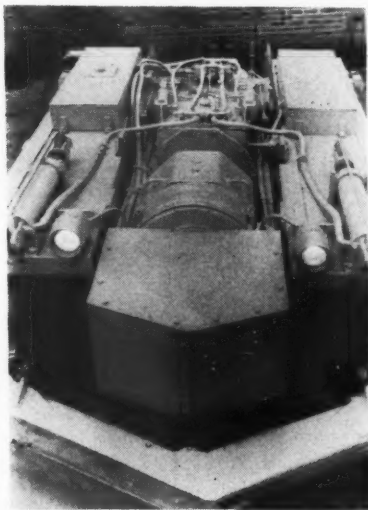
Blade Control Unique

The motor has a double shaft extension and is end and foot mounted so that the front shaft is inserted directly into the original clutch of the tractor. The opposite shaft end drives a hydraulic pump through a sprocket and chain, thus furnishing power for hydraulic steering and blade manipulation.

For grading purposes a bullgrader assembly is used. The blade is raised by two hydraulic boom swing jacks, mounted horizontally on each channel side frame at the front of the tractor. The barrel and sheave end of each jack is directly over the blade frame. A short piece of ¾-in. wire rope, at-

tached to the channel under the jack, passes through both sheaves and is fastened to the blade frame. As hydraulic pressure is applied, the blade raises and when pressure is released the blade is depressed by its own weight.

Hydraulic steering and blade manipulation are controlled through a control valve with three levers. The center lever of the control valve governs blade movement, and the two outside levers control a steering cylinder assembly on each side. Each steering assembly controls its own steering clutch and brake simultaneously.



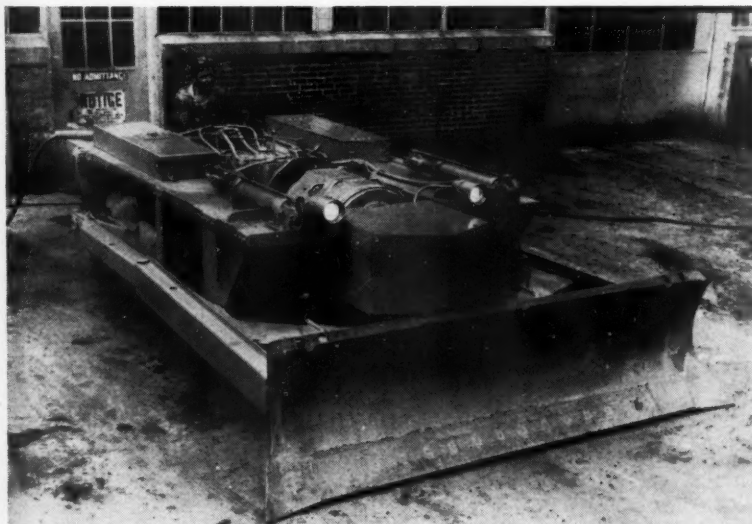
A 24-gal hydraulic fluid tank has replaced the radiator of the original machine

When pressure is applied, the brake is set and the steering clutch disengaged, allowing a turning radius of 90 in.

Machine is Slower

Connecting the electric motor directly to the tractor clutch has slowed speed of the converted machine less than that of the original machine in any one gear. This, of course, is due to the fact that the motor revolves at a rate of from 500 to 1900 rpm, averaging about 750 rpm, while the diesel engine ran at a rated governed speed of 1400 rpm. The approximate speed in first (the only gear used in the new machine) is 75 fpm compared to 141 fpm for the same gear in the diesel machine. The engine clutch is operated mechanically by a lever extension on the left side of the hydraulic control valve and the gear shift is operated in the same manner from the right side of the control valve. The high-low gear shift lever has merely been shortened to conform with the 48-in. overall height of the machine.

Once more the ingenuity of American coal operators has produced the answer to a perplexing problem.



The original clutch and gear shift levers are used, but controlled through a system of links and levers. The mechanic in the illustration is shifting gears

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40 Tons per man (7-man crew)
Seam—38" to 45"
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Mining two tons per minute

FOR YOUR INFORMATION:

We are happy to announce that a complete and amicable settlement has been made in the recent litigation. The suit has been dismissed and Jeffrey has received an exclusive license to develop, manufacture and sell COLMOLS and MOLVEYORS in the U. S. Obviously, we will continue to take care of your requirements.

Photo shows the No. 76-A COLMOL mining by the popular "offset cut" method. An entry approximately 19 feet wide can be driven in two passes of the unit. All operations are performed hydraulically. This low-type machine has a cutting range of 32" to 54" . . . weighs approximately 25 tons.



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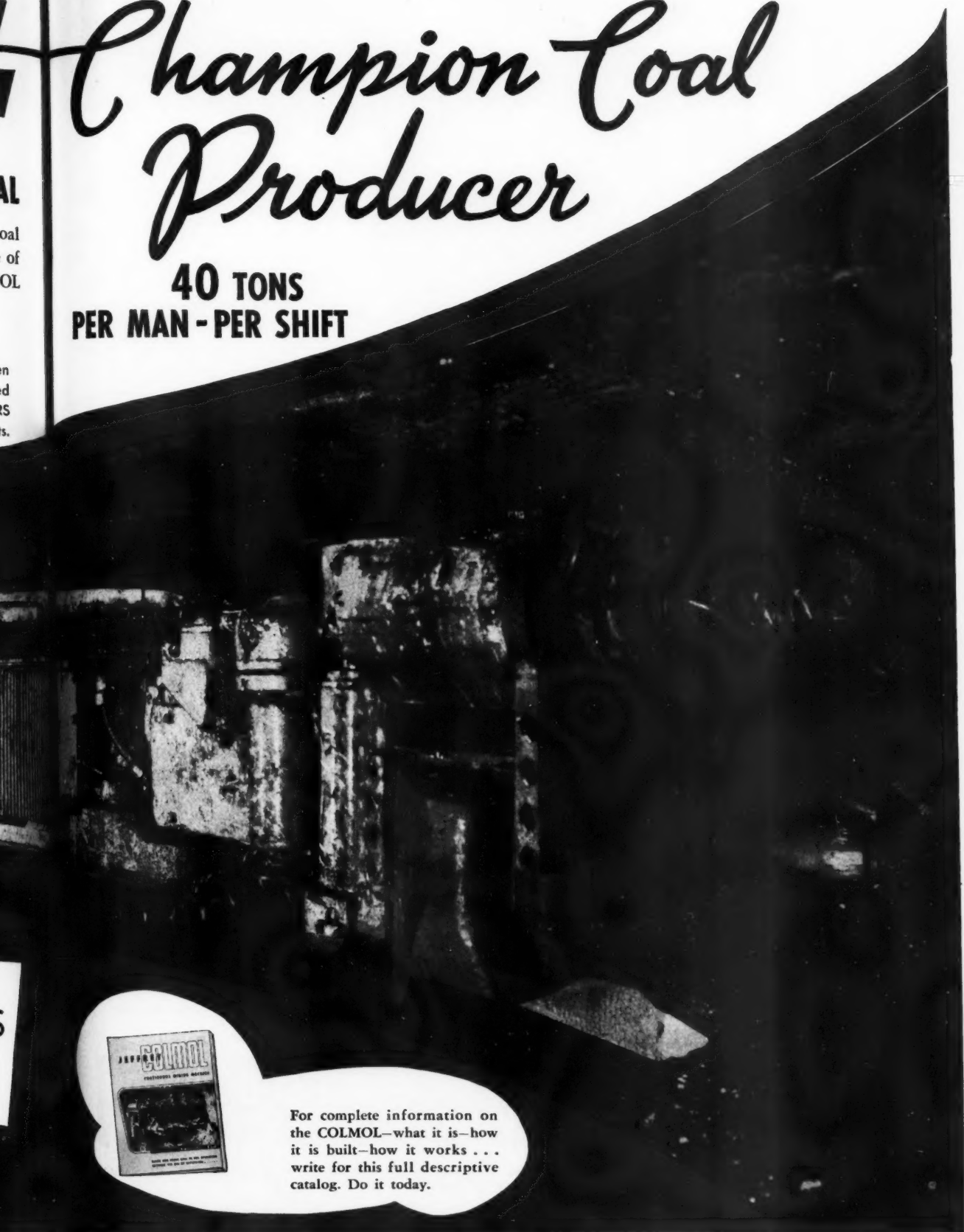
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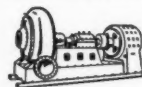
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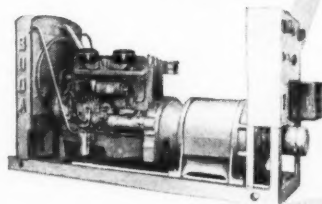
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Quality Control of Lubricants *



Quality control of lubricants is applied to 260 pieces of equipment

IT would be well to begin this discussion with an explanation of the title of the paper. Quality Control of Lubricants is a term used in the iron ore mining business to determine whether a lubricant is suitable for continued use in a piece of mining equipment.

For better understanding of the need for lubricant control, it is first necessary to describe the equipment used and second, the conditions under which it operates. Many types of equipment are used to mine iron ore such as 1000 to 2000-hp diesel electric locomotives, 300 to 400-hp, 30-ton trucks, 15 to 20-ton tractors, 40 to 50-ton diesel and diesel electric locomotive cranes, road patrols, diesel engine powered shovels up to $5\frac{1}{2}$ cu yd dipper capacity, electric shovels up to $6\frac{1}{2}$ cu yd dipper capacity, service trucks, loaders, portable and stationary diesel, gas and electric air compressors and many other types of powered mechanical equipment. In addition to the mobile mining equipment, we have semi-permanent stationary installations for shops, underground mine hoist installations, etc. The majority of the mining equipment operates seven days a week, 24 hours per day. The men are on a 40-hr week schedule, which means that the equipment is operated by a number of persons during a week. This constant changing of operating personnel necessitates a good control method

* Based on a paper given before the Association of Iron and Steel Engineers.

Decreased Oil Consumption, Longer Engine Life, Lowered Maintenance Costs Are Some of the Benefits of Carefully Planned Program

By C. R. BURTON

Superintendent of Maintenance
Oliver Iron Mining Co.

for lubricant handling and application to eliminate the mixing of lubricants and insure the correct application and renewal of lubricants when required. Another obstacle to proper lubrication of mining equipment is the result of operating conditions. The majority of mining equipment is started and operates out of doors in sun, rain, and snow in temperatures ranging from plus 100° F to minus 40° F.

Analyze Requirements

The lubrication control program now in use by the Hibbing-Chisholm District of the Oliver Iron Mining Co. was first started when the lubrication requirements of all equipment in use was analyzed and these requirements compared with what was being used. It was discovered that over 65 different oils and greases were used for winter and summer operation. By evaluating and consolidating, this number of lubricants was cut to 12 different products. This consolidation of lubricant brands and types has had a threefold benefit; it minimizes the chance of using the wrong lubricant,

it yields a benefit through volume purchasing and it requires less inventory and accounting expense.

Personnel Training Program

The second step in establishing the controlled lubrication program was to make sure that the people responsible for lubrication knew what lubricant was to be used and where. This educational part of the program was attempted in the following manner. On machinery which presented complicated lubricating problems maintenance engineers were assigned to the job of making schematic charts showing each grease or oil check point and indicating the kind of lubrication, amount per application and the frequency of application required. These charts were posted on the equipment together with a list of the lubricants to be used on the particular equipment. This list is used in ordering lubricants from a central storage point.

A sound slide film was made show-

ing the correct method and the importance of lubricating a particular type of equipment. The aid of the operating foremen in the various mines was enlisted by having meetings at which the cost of improper lubrication was emphasized by citing costs of repair which could have been eliminated on the equipment in their charge by proper lubrication and by showing them the film slide on how and where the lubrication should be done. The workmen directly responsible for the lubrication of machines were then called in and instructed with the film slide, pointing out the costs of faulty lubrication and how their job was being made easier. This is being done through installation of the lubrication charts, power greasing equipment, both air and electric barrel pumps with retractable grease hose reels, centralized lubricating systems and better lubricant handling facilities. In some instances, for mobile equipment operating "around the clock," a lubrication truck is provided, carrying the necessary lubricants to the equipment on the job and aid in the lubrication.

Oil Consumption Varies

The third phase of the controlled lubrication program involved insuring that the best lubrication was being obtained for the least expense. First, one of the large items in lubricants cost, engine crankcase oil, was checked to determine whether the recommended change period was correct. In order to decide this, a program was set up to take a sample daily from a representative group of each type of equipment. This sample was then analyzed to determine whether it met the minimum specification required for proper lubrication of that par-



Special suction gun is used to take samples of crankcase oil

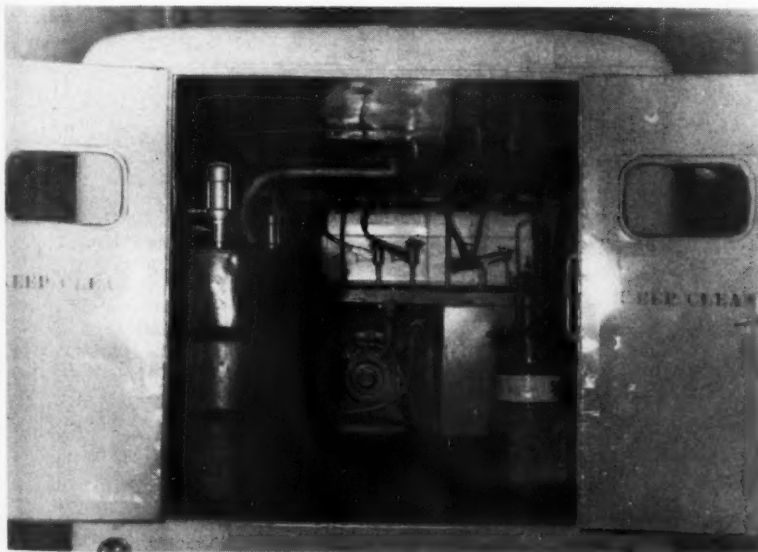
ticular equipment. It was soon discovered that no blanket oil change period could be set up to cover all engines in any particular type of equipment. The change period recommended by the engine manufacturer is designed for the average engine. It does not mean that if the recommended change period is followed on all of their engines no operating difficulties due to faulty lubrication will be experienced. Some engines may dangerously dilute the oil, because of faulty injection or poor carburetion, in a relatively short number of hours. Others may develop water leaks into the lubricating system or contaminate the crankcase oil through engine blow-by or faulty operating temperature.

Still other engines may continue to operate hour after hour and the oil will remain in a "good as new" condition. It seemed reasonable to expect that a simple daily check of the crankcase oil condition in all engines would make it possible to decrease the oil change frequency. This procedure would also minimize the danger of losing an engine due to faulty crankcase oil, and extend engine life by reducing wear.

Crankcase Oil Tested

Utilizing the experience of lubrication experts from various oil companies, the following procedure was developed. Oil samples are withdrawn daily from all equipment that has been operating continuously. These samples are sent to an oil analysis laboratory. The sample of oil is taken by using a special suction gun developed for the purpose. Some installations are provided with a pet-cock drain where a representative sample may be taken. However, the sample gun method is preferred because it eliminates the danger of oil loss due to vibration breaking of auxiliaries to the pet-cock drain or loosening of the pet-cock valve. It also avoids contamination of the sample.

Two simple checks are then made on the used crankcase oil: the first is a viscosity determination in which a small sample of the used oil is placed in a test tube with a steel ball. This tube is then placed in a rack along with other tubes containing samples of the same new oil of different viscosities. For example, if the used oil being checked was originally a S.A.E. 30 oil, the samples of new oil would be S.A.E. 30, 20, and 10. The falling sphere comparative rack is then

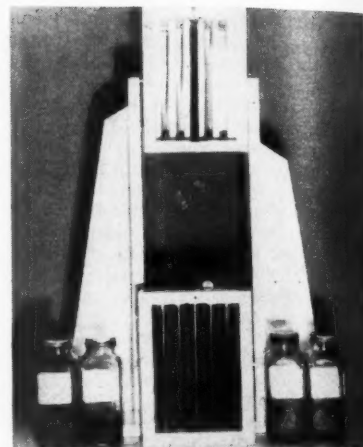


Lubrication truck is equipped to service units in round-the-clock operation

tipped over and the dropping speed of the steel ball is noted in comparison with that of the steel balls in the samples of new oil of the different viscosities. The used oil is then rated as a plus or minus 30, 20 or 10, depending on the relation of its viscosity to the viscosities of the samples of new oil.

The sample is then diluted 50 percent with benzine in a special calibrated tube and is centrifuged in a Delayal Model 100 centrifuge for 12 min. After spinning, the percentage of solids accumulated in the end of the tube is noted and recorded. The results of these two simple tests are then recorded on one sheet for comparison. The figures obtained from these two tests for the various samples of used oils are then compared with standard allowable limits of viscosity and sediment established from our past experience. The viscosity limit is 10 points lower than

the unused oil. For example, if the comparative viscometer indicated that the viscosity of a used oil sample was approximately the same as that of a new S.A.E. 20 oil and the original oil had been an S.A.E. 30, the unit would be allowed to operate. However, if the viscosity of the sample tested lower than the limit, steps would be taken to bring the unit in immediately for an oil change and a check-up. The limits on sediment have been set at .6 percent by volume for a truck, tractor, grader, or car engine, and .14 percent sediment by volume for a diesel locomotive or similar unit crankcase oil. If the sediment in the used oil sample is found to be above the limits, the oil laboratory calls for a cartridge change in the lubricating by-pass filter. Attempts are being made to standardize on a re-packable lubricating oil by-pass filter cartridge to lower the cost of a filter cartridge change.



Viscosity test is simple; time the fall of the ball

Call Sheet Issued

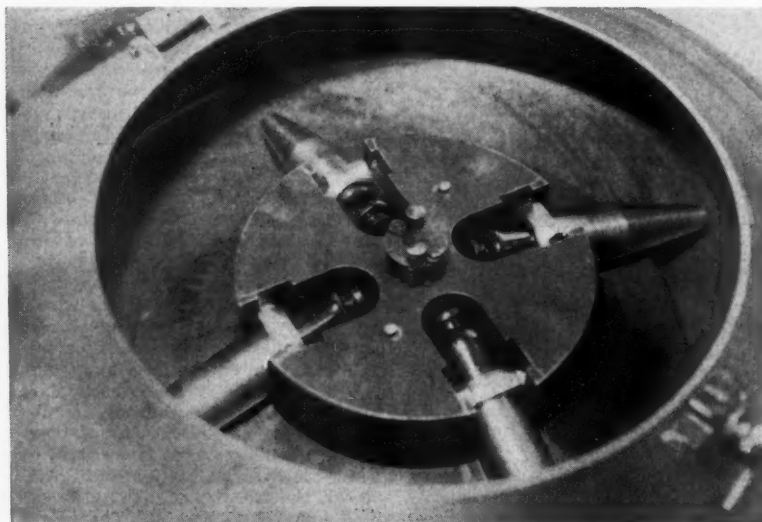
From the posting sheet, on which all the samples for that day are posted, the laboratory technician posts to an individual unit engine card the results of the sample examinations and the number of operating hours. A call sheet is then made out for each mine, garage or foreman, depending on the condition, using the complete sample posting sheet and the individual engine card sheet as a guide which lists any periodic check to be performed and the necessary measures taken to correct the faulty oil condition. Some of the items found on this sheet, that have been previously set up by the foreman in charge of the equipment, are: grease job (based on operating hours), oil change, oil filter cartridge change, injection system check, check for fuel, water or hydraulic oil or lubricating oil leaks, special filter checks or changes, or any other item the foreman in charge of the equipment may have set-up on an hourly basis.

Bi-weekly Report Made

The information from the call sheet is forwarded to the foreman, garage or shop, depending on how the work is to be handled; the work required is completed and the noted sheet is returned to the oil laboratory. Every two weeks the oil laboratory prepares a report that is sent to the lubrication foreman, truck and tractor foremen, locomotive foreman, and superintendent of maintenance. This report contains a two-week summary of the crankcase oil condition of equipment under the supervision of the oil laboratory. The report includes such items as total engine operating hours during the period the report covers, crankcase oil added, number of oil changes, number of filter changes, hours on the oil since last changed and hours on the filter since last

EQUIPMENT NO. 598		TYPE OF ENGINE												TYPE OF FILTER Sternalube HLM (Test)											
DATE July		15	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8
VISCOSITY		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
SEDIMENT		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
CORROSION																									
HRS. ON OIL		337	346	363	375	387	400	416																	
HRS. ON FILTER		337	345	363	375	387	400	416	430	444															
HRS. ON GREASE & FILTER		337	345	363	375	387	400	416	430	444															
HRS. ON AUGMENT		337	345	363	375	387	400	416	430	444															
TOTAL HRS. ON ENGINE TO DATE		337	345	363	375	387	400	416	430	444															
OIL ADDED / DAY (QT.)		7	7	7	7	7	7	7	7	7															
TYPE OF OIL		26	104	86	83	82	85	60	60	91															
TYPE OF FUEL																									
REMARKS																									
HRS. ON TRANSMISSION		337	345	363	375	387	400	416	430	444															
HRS. ON DIFFERENTIAL		337	345	363	375	387	400	416	430	444															
HRS. ON TORQUE CONVERTER		337	345	363	375	387	400	416	430	444															
SERIES																									
EQUIPMENT NO.																									

Engine Card summarizes maintenance data



Samples are centrifuged to determine how much sediment they contain

changed. The report also tabulates the engine crankcase oil consumption in quarts per hour of each engine for a four-month period. This same report tabulates the units that had crankcase oil dilution or high sediment and fuel oil consumption. The report gives the maintenance foreman a very good picture of the engines under his care and allows him to plan for engine change-outs and overhaul in advance. When engines consume one quart or more per hour of crankcase oil, they are changed out or overhauled.

Also Check Cooling System

At the present time there are 260 pieces of equipment for which the oil laboratory handles the quality control of the lubricants. The oil laboratory also analyzes incoming shipments of fuel oil, recommends cooling water

treatment, and analyzes greases and oils to determine that they meet the specifications required. The cooling water is sampled periodically, tested, and reported in the same manner as the lubricating oil.

Benefits of Program

The quality control of lubrication is one item in a preventive maintenance program which is in effect in the Oliver Iron Mining Company. This program is aimed at increased production with less downtime of equipment and at keeping repair and maintenance costs at a minimum. The quality control of lubricants has had good acceptance by the maintenance foremen because it eliminates clerical work that would have to be done by him or his mechanics, besides giving him a check on engine condi-

tions. The maintenance foremen are now changing-out or overhauling engines based on an oil laboratory report on oil consumption. This means a planned delay instead of a breakdown to the mine operators. In justification of the expense of such a program, it may be stated that the saving afforded the company due to volume purchasing and decreased oil consumption has more than paid for all the expense involved. Decreased engine wear, which means lower repair and maintenance costs and increased mine production, is an additional benefit derived from the program.

With the aid of lubrication experts further experiments are being made towards the consolidation of oils, greases and various checks to arrive at even more effective quality control of lubricants.

Maintenance

(Continued from page 31)

ated periodically by these greasers. Belts are cleaned of spillage by cleaners who are assigned their duties by the general foreman. Periodic inspection of belt lines is also done by men sent out by the general office to check on line, level, lubrication, and cleanliness. Drive pulleys are also inspected periodically. This is necessary to determine the wear on the lagging.

During the working shift, a constant visual inspection is made by the operator, assistant foreman, and mechanic. Should anyone observe anything unusual, it is brought immediately to the attention of the assistant foreman and the mechanic who decide whether

to stop operations or to continue until such time as the repairs can be made without interrupting production. Generally speaking, minor repairs, so long as continued operation will not cause further damage to the machine, are left until the end of the shift when the mechanic makes the repairs.

Every attempt is made to change complete units rather than individual broken parts. There are two reasons behind this. First, changing the entire unit is in many cases faster than disassembling the unit and replacing the broken parts, second, a pile of slack makes a poor workbench. An example of this would be a broken wheel unit where the entire unit would be changed rather than the broken parts. Hoses are made up with fittings attached in advance rather than waiting until a breakdown occurs. There are, however, certain disadvantages to this system in low coal. The difficulty in moving large and heavy parts sometimes prevents the unit change.

Follow Regular Schedule

Preventive maintenance, in general, is done between shifts and on idle days. Things observed by the assistant foreman and his mechanic on their visual inspection which need immediate attention are repaired following the shift. The chief electrician, from personal inspection of the machines and information received from his shop foremen and mechanics, sets up a repair schedule of work to be performed on the idle day and sees that the material is on hand to carry out the schedule. He sets the number of men required and sees that supervision will be on hand while the work is going on.

Experience on continuous miners has shown that on three-shift operation, certain parts must be adjusted weekly. To be specific, the cutting chains, conveyor chains, the swing jacks and certain hoses all should be checked

weekly. In addition to these regularly occurring jobs, controllers, master switches, motors, cables, etc., are periodically checked and repaired. Preventive maintenance on shuttle cars is set up in the same way.

Units which are taken off machines in the mine sections are sent to the outside mine shop where they are dismantled, thoroughly cleaned, and the worn or broken parts replaced, making the unit ready for service. In the event of a major breakdown that cannot be handled in the section, the entire machine is sent to the outside shop.

In the rebuilding program, continuous miners and shuttle cars are completely torn down and reassembled. Parts are thoroughly checked and replacements made where necessary. Any beneficial change in design is also incorporated so that the machine will be as modern as possible. Some machines are rebuilt locally, while others are sent to the manufacturers. Records are a definite help in establishing a basis for rebuilding.

Maintenance Is The Key

With the coming of conventional mechanical loading came a change in the psychology of all phases of operation. This, in general, was particularly true of maintenance. In the old hand loading days, it mattered little if a motor or cutting machine was down. When the mines changed to straight day work rates, most companies realized they were faced with different and vastly more difficult problems. In the old days the miner had to do a good day's work in order to eat. Today, if the worker doesn't do a good day's work, the supervisor and company don't eat. If this is true of conventional mechanical mining, it is doubly true of continuous mining and the key factor is maintenance of all face equipment.

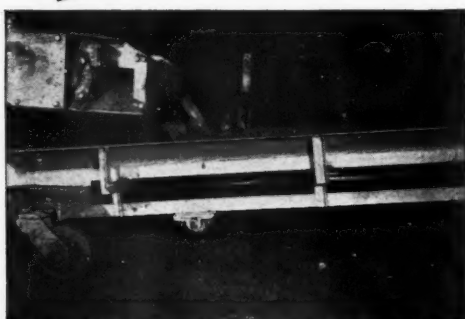


Good maintenance pays off in better production

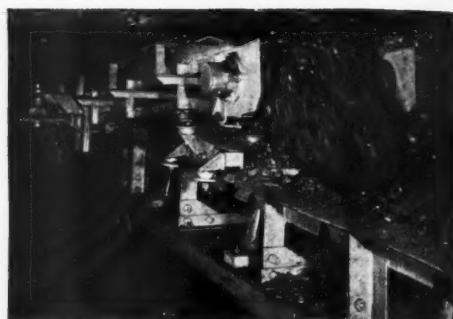
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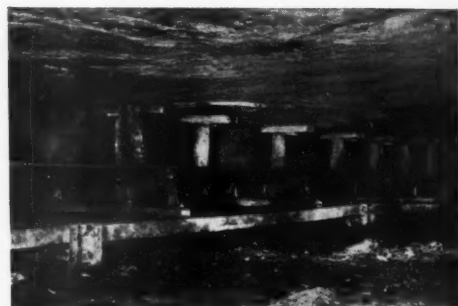
AT THE FACE, a portable Belt Conveyor takes coal *continuously* as fast as *any* machinery can produce and discharge it. The unit can be used in coal as low as 30". Rubber-tired, free-swinging casters make the portable easy to move and handle.



FROM THE FACE, the portable unit feeds the coal directly onto a shuttle Belt Conveyor. The latter consists of 8' pin-connected intermediate sections, each equipped with a pair of rubber-tired wheels. A covered deck protects the return strand of the Belt.



TO TRANSFER CONVEYOR. The shuttle Belt Conveyor delivers the coal onto a transfer Conveyor at a fixed-point discharge unit. The discharge pulley can be lowered when moving to another room or entry or when advancing the unit.



TO PANEL-ENTRY CONVEYOR. The transfer Conveyor feeds the coal onto a panel-entry Mine Conveyor. The latter is assembled with 8' or 10' intermediate sections of 26", 30" or 36" widths or wider. Sections are made for drop-in assembly; easily installed and extended.



TO MAIN HAULAGE CONVEYOR. The panel-entry Conveyor discharges the coal onto a main line Belt Conveyor system which consists of multiple tandem units assembled from 12' rigid intermediate sections. Such systems provide haulage from 500' to 5000'.



INTO PREPARATION PLANT. The coal is delivered from the main haulage system onto a slope Belt Conveyor (inclined or declined) for transfer into the preparation plant. From start to finish, coal transportation is *continuous*, fast, economical.

YOUR COAL OUTPUT PRODUCTION COSTS!

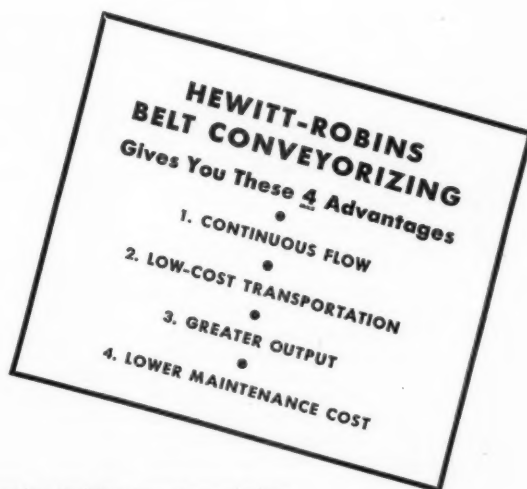
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Before dust control measures were instituted this coal chute and haulageway was an extremely dusty area

Coal Dust Control Underground

IN America today no industry is called upon to pay more for silicosis than mining. Pulmonary disability has long been recognized as a hazard of metal mining. Its incidence, once high, has been effectively reduced in metal mines through dust control measures, so that the dust problem is no longer one of major importance. In coal mining, where new methods of roof bolting, mechanical mining and coal transportation are being developed almost daily, the industry is constantly creating new dust problems and devising new methods of abatement.

Pennsylvania has no law specifying limits of air dustiness stated in million particles per cubic foot (m.p.c.f.) but the Bureau of Industrial Hygiene has adopted the threshold limits of air dustiness as specified by the American Conference of Governmental Hygienists.

The 50 m.p.c.f. limit for total dust (below five percent free silica) is a level not hard to achieve in anthracite mining. Anthracite dust usually contains less than five percent free silica so that relatively crude methods of dust control are adequate.

Five-hundredths of an ounce of fine bituminous coal dust per cubic foot will produce a dust explosion under the proper circumstances. Anthracite dust has never caused a mine explosion but concentrations above 50

Coal Dust Is Being Brought Under Control by Education, Use of Modern Detection Devices, and the Application of Latest Abatement Methods

By R. EMMET DOHERTY

Dust Control Engineer
Anthracite Institute

m.p.c.f. inhaled over a long period of time may cause lung changes and are considered hazardous to health. In fact, any airborne coal dust when inhaled in excessive quantities over a long period of time causes lung changes.

Study Ways and Means

At the present time there are six well-equipped dust laboratories in the anthracite region, maintained by the Glen Alden Coal Co., Hudson Coal Co., Lehigh Navigation Coal Co., Lehigh Valley Coal Co., Philadelphia and Reading Coal and Iron Co., and a central laboratory at the Anthracite Institute. The duties of the 18 trained engineers and technicians of the dust laboratories consist of sampling working places underground to evaluate the need for dust control. They compile records and report conditions to

management, making recommendations for abatement by the installation of control systems, using the type of equipment best suited to the location and the type of mining being done. It is their job to consult with mine foremen, assistant mine foremen, maintenance men and miners as to the location of water nearest to the section to be controlled, whether tank cars, boreholes or pumps are to be used, and what methods the miner likes best so that all concerned with the problem will be able to cooperate.

The most important feature to be considered in abating dust is to recognize the fact that once dust becomes airborne it is extremely difficult to control. All measures in use at the present time are based on controlling the dust at its source, whether the work is being done in coal or rock. Of the many standard methods of fil-

tering, trapping or precipitating airborne dust, only a few are suitable for use in coal mines.

Water Helps

To control anthracite mine dust, each dusty working place must have an adequate supply of water, under at least 40 psi pressure at all times. This part of the program sounds simple but has proven to be extremely complex due to the enormous area over which pipe lines have to be extended. Each panel of chambers, or breasts, must be supplied with water at the working face. At this point hose is used to carry water to the cutting machines and wet-type jackhammers. When undercutting and drilling are completed, the hose is equipped with a full-cone, brass sprayhead to wet the place down before blasting takes place. After the shots, the miner drives out the smoke, dust and fumes with the water spray.

Water is generally obtained from some source of inside accumulation of seepage water and is usually acid to some degree. It is interesting to note that several companies in the region have piped fresh water into the mine from the surface. This serves a two-fold purposes. Some wet-type jackhammers corrode when acid mine water is used. The fresh water can also be used for drinking fountains underground. The cost of installing drinking stations is low and the praise given by the mine worker is high.

Dust studies made in some mines in the region showed that dry coal when loaded into cars at gangway chutes produced dust concentrations between



Dust and gas laboratory of Glen Alden Coal Co., Wilkes-Barre, Pa., is one of many maintained by coal companies and the Anthracite Institute

900 and 1400 m.p.c.f. with an average free crystalline silica content of two percent, determined petrographically. Four full-cone spray nozzles delivering 15 gpm of water were installed to wet the coal in the chutes before loading, allowing about two hours for saturation. Dust samples taken during loading then averaged 30 m.p.c.f.

Ventilation Not the Whole Answer

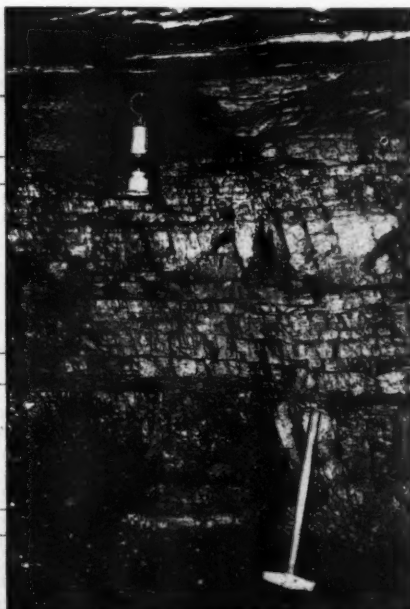
While ventilation plays a major role in maintaining the health and welfare of the anthracite mine worker, its importance to dust control is largely confined to sweeping away and rendering harmless the gases coming from the

coal veins and noxious fumes created by explosives. Federal and State standards, requiring 200 cfm of air for each person in a working place, are intelligent rules, falling within certain limitations as far as dust is concerned. If no ventilation were provided, some dusty places would have astronomical dust counts and conversely if too much ventilation is

Threshold limits of air dustiness as specified by the Meeting of the American Conference of Governmental Hygienists.

Mineral Dusts	M.P.C.F.
Alundum	50
Asbestos	5
Carborundum	50
Dust (nuisance, no free silica)	50
Mica (below 5% free silica)	50
Portland Cement	50
Talc	20
Silica:	
high (above 50% free SiO ₂)	5
medium (5 to 50% free SiO ₂)	20
low (below 5% free SiO ₂)	50
Slate (below 5% free SiO ₂)	50
Soapstone (below 5% free SiO ₂)	20
Total Dust (below 5% free SiO ₂) ..	50

Pocono Sandstone	
Main Roof	
Poorly Consolidated Gled (carbon and sandy shale)	1.0 ft.
Slate	0.3 ft.
Coal	2.8 ft.
Slate	0.3 ft.
Coal	2.0 ft.
Slate	0.3 ft.
Pocono Sandstone	
Bottom Rock	



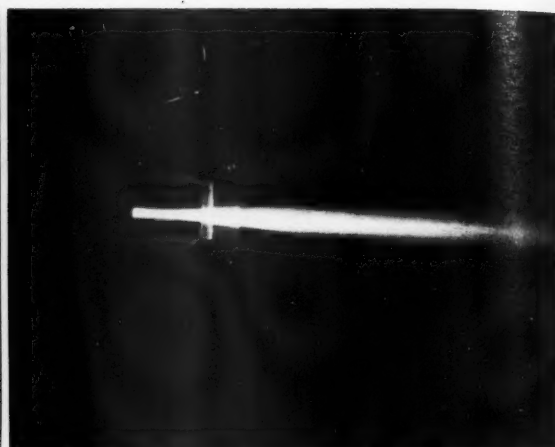
Typical anthracite vein shows slate, shale and sandstone refuse, sources of free crystalline silica

provided even heavy dust particles, normally having a fast settling rate, would sweep through the mine along with large quantities of settled dust picked up by the excessive air velocity.

Apparently, relative humidity and airborne dust have no relationship. Occasionally dust samples have been taken in mining areas where the top and bottom rock contain running seepage water, causing relative humidity readings of between 95 and 100 percent. Dust counts indicated from 500 to 1000 m.p.c.f. in these areas. Some coal veins near the outcrops, others standing on heavy pitch and still others in local basins are permeated with water, especially where the vein has been disturbed by faulting. The relative humidity in these working places varies between 75 and 100 percent with no visible airborne dust.



Colored filter windows with angular illumination allow estimation of air's dust content



Dust concentration of 50,000,000 particles per cu ft makes light beam from miners cap lamp visible from side

Samples result in counts as low as one to three m.p.c.f.

Some bituminous mines use misting sprays mounted on cutter bars, loader heads and other points where coal is being cut or loaded. Water is supplied at pressures as high as 300 psi to provide a water mist with a high impingement characteristic to wet the coal. Anthracite is more easily wetted, requiring a minimum pressure of 40 psi although the wettability with a pressure of 75 to 85 psi is noticeably better than at lower pressures. Where water is abundant and easily given sufficient pressure wetting agents are not generally necessary. In a few areas they may be needed to stretch a small water supply.

Caution must be used in the operation of wet-type jackhammers where the water pressure available exceeds the compressed air pressure. If the water valve is opened wide the hammer position chamber loses its efficiency and the hammer does not drill as fast as when used dry. In general, the miner operating a wet-type hammer opens the water valve only enough to prevent the drill steel from sticking in the drill hole. The thick mud flowing from the collar of the hole usually indicates that dust produced is well within safe recommended limits.

Good Lighting Shows Dust

The mining industry in the anthracite region is a century and a quarter old and has progressed through generations of underground workmen using candles, sperm oil lamps, naphtha lamps, calcium carbide and miner's electric cap lamps. Only the electric cap lamp gives any indication of excessive dust in mine atmosphere by direct visual means.

It has been noted that in places where 100-watt bulbs are used at the loading points on gangways, dust con-

trol measures are applied more diligently than in places not so illuminated. A complete study of mine illumination might well provide work for research, toward great improvements in dust control.

Almost every paper written about airborne coal dust discusses, to a limited extent, various methods for evaluating a dust hazard with a number of technical instruments. Yet no one has come forth with the most important single phase of this problem, a method for instant recognition of dust hazard that can be utilized by the average underground worker. The simplest means of recognizing a dust hazard would naturally be the eye. But underground illumination is usually poor and dust concentrations that would seem alarming in daylight are not even noticed underground. Factors such as wide variation in granulometry or particle size, variation in particle coloring from black to white, variation in illumination intensity and differences in background surface and color characteristics all tend to permit dangerous concentrations of airborne coal and rock dust to go unnoticed.

A step toward making airborne dust visible was demonstrated by the writer in 1917 in a series of talks to more than 3500 anthracite mining officials when a beam of light from a miner's electric cap lamp, equipped with a special polished reflector, became clearly visible at right angles to the axis of the light beam. This was made possible when the narrow beam of light was directed through a glass enclosed miniature mine gangway equipped with a circulating air duct and a ventilating fan which kept a quantity of fine coal dust in suspension. It was stated at that time that an airborne concentration of coal dust of 50 m.p.c.f. could be seen very plainly in the beam of the lamp underground. The United States Public Health Service indicated, from a

health standpoint, that 50 m.p.c.f. was a maximum safe limit if the dust did not contain more than five percent quartz. (Public Health Bulletin No. 221, "Anthracosis-Silicosis Among Hard Coal Miners")

Since that time a new and more powerful miner's electric cap lamp has been manufactured and an entirely new method of utilizing this light source has been developed where dust concentrations of less than five m.p.c.f. of either coal or rock can readily be seen with the naked eye. With this new method any underground worker can examine the air for dust with his electric cap lamp in the same manner that he tests the air for gas with his flame safety lamp. By placing a small enclosing hood containing an optical system over his electric cap lamp he can read the dust concentration comparison scale and tell whether dust control measures are needed or whether those in use are effective.

Electric Cap Lamp as a Dust Detector

The new method utilizes either of the tungsten filaments in the latest model miner's electric cap lamp. Each filament has a rating of 4.85 v, and one amp and produces higher wattage than any previous model. Because only the illumination from the lamp filament is used, it makes no difference whether the reflector is polished or unpolished.

A close-fitting sheet metal cylinder, open at one end and slotted to pass the lamp headpiece bezel ring locks, is placed over the front of the lamp. A double convex lens 27 mm. in diameter, having a focal length of 32 mm. is mounted in the head of the cylinder in a suitable opening. A metal tube 3.25 in. long having an inside diameter of 0.75 in. is mounted on the cylinder head so that the focal point of the lens projects an image of the incandescent filament into space a few

millimeters ahead of the end of the tube. The inside of the tube is painted black. In microscopy, the image projection of substage lamp filament, through a condenser lens to the stage iris diaphragm is called Kohler illumination. It is at this critical focal point that airborne dust concentrations are viewed through colored filters having variable light transmission values in order to determine various dust concentrations.

A filter holder is arranged so that the projected light striking the dust illuminates the filters at right angles to the axis of the light rays. The filter window opening measures 23 mm. by 33 mm. and is divided into three color segments. One segment contains a Wratten K1 yellow filter, the second segment has a Wratten B58 green filter while the third has a Wratten C47 blue filter. The transparent filters are rendered translucent by a single sheet of Kodatrace, 0.0045 in. thick, which is sandwiched between the glass windows with the filters.

Analysis Simple

To estimate the concentration of dust present in the air, the instrument is held before the eyes, at average reading distance, with the filters toward the eyes and the light beam behind them, horizontal or vertical, shaded from any other source of light. When only the yellow filter is lighted, up to about five m.p.c.f. of dust are present. When the yellow and the green filters are lighted, up to about 40 m.p.c.f. are present and when the yellow, green and blue filters are lighted, more than 50 m.p.c.f. are present.

While very rough calculations can be made, from a numerical standpoint, the sharply focused beam of light, in total darkness, makes visible airborne dust concentrations as low as 800,000 particles per cu ft. Any individual using it immediately becomes conscious of the presence of dust in what is generally termed "pure air."

Only rough estimates of air dustiness can be made with this instrument because of such variable factors as darkness adaptability, eye acuity and color perception which vary in individuals, plus the difference in light dispersal characteristics of various dusts due to mineral coloring, surface luster and granulometry. Other contaminants such as smoke, fume, vapor or mist would naturally cause erroneous readings from a dust standpoint, but their presence would emphasize where they might otherwise be unnoticed. The most difficult problem in a dust control program is to acquaint underground workers with some degree of knowledge as to what constitutes a safe and an unsafe atmosphere. A low cost instrument such as described here would

certainly create interest in dust control and insure greater interest in control measures. From a record standpoint, however, the impinger, thermal precipitator, jet counter and other instruments now used in sampling the air for dust content will continue to find wide use.

Summary

The most important phase of prevention of occupational disease as a result of inhaling harmful dust is adequate control from an engineering standpoint. Almost equally important is the task of acquainting underground workers with the hazard and gaining their wholehearted cooperation in the use of control measures.

Constant dust sampling of mine atmospheres is necessary, not only to provide records of the work being done, but also to keep underground workmen aware that a dust problem exists and that progress of control is being followed closely.

Introduction of new types of mining equipment or methods should be carefully analyzed from a dust producing standpoint. Demands should be made on mining equipment manufacturers that dust control features be "built-in" all machinery and equipment capable of producing dust.

Adequate ventilation must be maintained in all coal mines in order to dilute, render harmless and sweep away dangerous gases, reduce temperatures and lower humidity. How-

ever, dust in excessive quantities is not rendered harmless by mine ventilation but may be carried by air currents from one working place to another, resulting in pollution of many working places adjoining on an air split. Ventilation can substitute for dust control measures only when each working place is on a separate split of intake air.

No method has been found in anthracite mines that will prevent settled dust from being thrown into the air by blasting, transportation or excessive ventilation. Experiments were conducted on haulage roads where certain chemicals were mixed with haulage road dust and subsequently wetted. No permanent consolidation of dust was obtained that gave promise of being any better than frequent use of water. Large accumulations of settled dust should be cleaned up and loaded out of the mines.

Wet-type jackhammers, which are used in all rock work in anthracite mines, are gaining steadily in popularity.

There are signs on all sides that dust control is making steady progress in most coal mines. Each year more people are becoming interested in the subject and more information is being made available.

About 80 percent of the anthracite producing companies are using dust control methods. The improvement in atmospheric conditions in anthracite mines over the last ten years has been truly amazing.



It's easier to prevent a dusty condition than it is to remedy it later

How to Locate Trolley Frogs

By T. H. SAWYER

Ohio Brass Co.

SMOOTH operation of the current collector through a trolley frog depends on many factors. The most important of these are locomotive speed, radius of curvature of the track, and of course, the trolley frog itself. Needless to say, a frog which is not designed correctly will cause endless trouble in the way of dewirements, and dewirements are costly and dangerous. Even a properly designed frog will become troublesome if it is left in the line too long.

Locomotive speed is probably the most important consideration in smooth frog passage. At very low speeds, a turnout can be manipulated through almost any frog. But if high

¹ This angle is based on tests of various Ohio Brass Co. frogs and may vary slightly for other frogs.

speed haulage is used, the frogs must be right. To give trouble-free performance a frog should have a smooth approach, positive guidance and ample clearance for the turning collector; and, just as important, it must be located correctly.

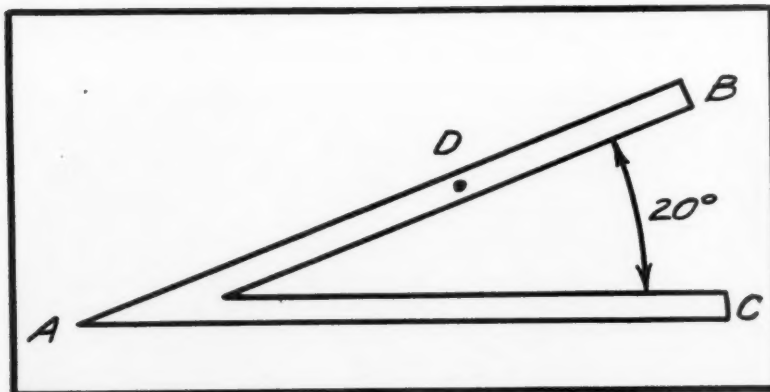
When the frog is placed correctly, the trolley pole will supply sufficient pull on the collector to guide it quickly and smoothly into the turnout leg without causing excessive wear on the frog and collector. This pull depends on the angle between the horizontal projection of the trolley pole and the turnout leg, when the collector is at the frog center. Of course, frogs vary somewhat but with a good high speed frog, this angle will be about ten°.

Then, assuming the frog angle is ten°, the trolley pole projection should make an angle of 20° with the straight through wire.

The method outlined below is the easiest one for finding the spot that will give the best frog performance.

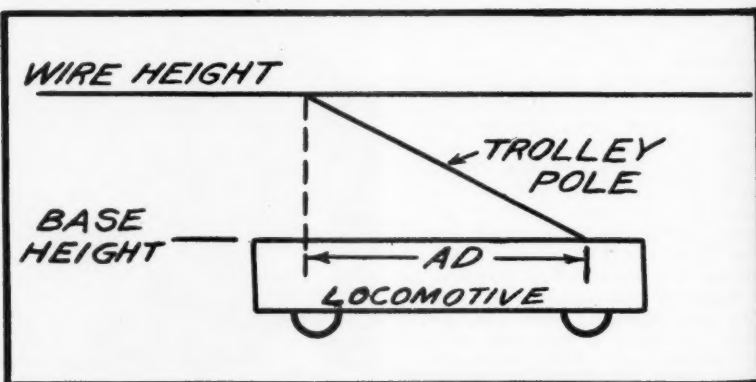
Deviation in either direction from this spot will cause frog trouble. If the frog is placed closer to the track switch, the pull on the collector will be lower and hence operation through the frog will be less dependable. If the frog is placed farther away from the track switch, the pull will be too great causing excessive wear on the overhead and the collector.

Of course, not all locomotives are exactly alike. The trolley bases may

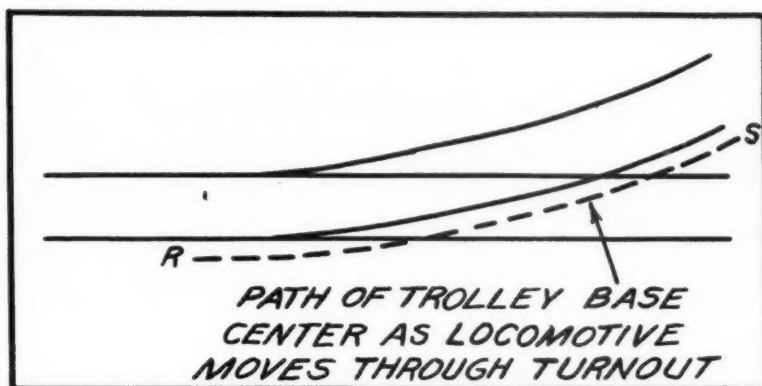


(1) First make a wooden template. The length AB should be equal to the length of the trolley pole, and the angle between AB and AC should be 20°. The length of AC is unimportant

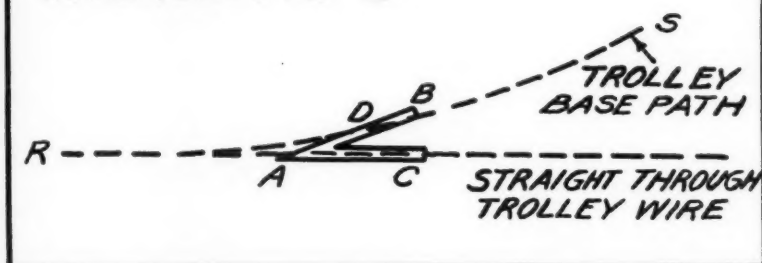
(2) Measure the horizontal projection of the trolley pole (AD). Since this length varies with the height of the wire, it is best to make this measurement at the approximate point where the frog is to be installed. Lay off this length AD on the leg AB of the template



(3) Next trace an arc on the ground along the turnout rail as indicated by RS. This arc represents the location of the center of the trolley base. It may be traced by making a series of marks in the ballast directly below the pole base as the locomotive is slowly moved over the turnout



LEG AB & ARC RS
INTERSECT AT D



(4) Lay the template on the track with the leg AC directly under the straight-through wire and in line with it. Move the template along the track until the arc RS intersects leg AB at D. With the template in this position, A is directly under the point in the trolley wire at which the frog center should be placed

be in different locations or the trolley poles may be different lengths. The location of the trolley frog should be such that the trolley poles on all of the locomotives make an angle of at least 20° with the straight through wire. Then, on some locomotives, the angle may be greater than 20°. As mentioned before, this will increase collector wear on these locomotives and will also increase overhead wear. In order to eliminate this difficulty, the locomotives should be made as nearly standard as possible. That is, the path of the trolley base (RS in

the figures) and the horizontal pole projection (AD) should be the same for all locomotives at each particular mine.

On very large radius turnouts, an angle of 20° is not always practical due to excessive swing of the trolley pole. In some instances—when the turnout track passes under the straight through wire—an excessive pole swing endangers the motorman. If this happens, location of the frog closer to the track switch may become necessary. This necessitates reduced speed or manual guidance of

the collector through the frog or both.

Because of frog variations, some experimentation may be necessary to determine the best angle for any particular frog. The minimum angle, however, should be 20°. Frogs which were not designed for high speed haulage may require a somewhat larger angle for smooth operation.

A correctly located high speed trolley frog will give very satisfactory operation. Many hazardous de-wirements will be avoided and long overhead and collector lives will be realized.



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Steel of GOVERNMENT



As Viewed by A. W. DICKINSON of the American Mining Congress

THE House resumed its sessions April 22 following the ten-day Easter recess, and is speeding action on the two appropriation bills which have not been sent over to the Senate. There is real interest in what the Senate will do to hold the line on the budget cuts made by the House. It is generally believed that the Senate will support the House in the economy drive and, if this be true, the end of the current fiscal year may even show a modest surplus, as revenue returns have been heavy.

Highlight of the month was the resignation of Defense Mobilizer Wilson in protest over the Administration action in the steel wage-price battle. This was closely followed by government seizure of the steel companies. The steel companies resort to court procedure brought forth startling assertions by the Department of Justice of powers vested in the President above and beyond the jurisdiction of the Federal courts.

Defense Production Act

The steel crisis and Wilson's resignation brought a vote in the Senate Committee on Banking and Currency on April 9, to defer action on the bill extending the Defense Production Act. The Committee met again on April 17 and on April 23 voted to again defer action until May 16.

Meanwhile the Committee will conduct further hearings, at which Wilson will appear on April 29, to be followed by steel industry and labor representatives on April 30. The Committee Chairman, Senator Maybank of South Carolina, has commented that the steel settlement will materially affect whatever is done with respect to extending the Defense Production Act.

WSB Investigation

The House on April 24, by a vote of 255 to 88, approved a resolution by Rep. Leo Allen (Rep., Ill.) for an investigation of the Wage Stabilization Board. Allen's resolution directs the House Labor Committee to investi-

gate WSB and its policies, to determine if the Board has made any decisions or recommendations which are "inconsistent" with the intent of Congress.

Chairman Graham Barden (Dem., N. C.) has stated that his full House Labor Committee will conduct the investigation. In urging approval of his resolution, Rep. Allen charged the WSB with "openly flaunting the will of Congress" by recommending a union shop for the steel industry.

St. Lawrence Project

Although under strong pressure from administration sources, the Senate Committee on Foreign Relations on April 22, by a tie vote of 6 to 6, rejected a motion to report the St. Lawrence Project bill. Following this action the Committee voted 9 to 4 to report the bill to the Senate "without recommendation." The Majority Policy Committee of the Senate has not acted to place the bill on its program and hence the possibility of consideration on the floor is doubtful.

President Truman has agreed with Canadian Foreign Minister Pearson to join in a request to the International Joint Commission for approval of the Canadian Government's plans for the Project "in order to lose no time if the Congress does not act."

Freight Rates

The Interstate Commerce Commission on April 14 granted the carriers the full 15 percent increase in freight rates originally requested in January, 1951. This latest increase supercedes the interim allowances approved in March and August of 1951. The increases are to be added to the basic rates and charges which were in effect in January, 1951. The authorization to apply these rates however, may not extend beyond February 28, 1954.

The ICC order specifies, as exceptions to the general rate increase, certain special maximum increases: copper, lead and zinc articles, 12 cents per 100 lb; phosphate rock (including

★ ★ ★ ★ ★ ★ ★

Washington Highlights

★ ★ ★ ★ ★ ★ ★

CONGRESS: House returns to work.

DEFENSE ACT: Waits on steel issue.

WSB: Under investigation.

ST. LAWRENCE: Reported to Senate.

FREIGHT RATES: Increased.

COAL MINE SAFETY: House drafts new bill.

phosphate clay) and salt, 60 cents per ton; potash \$1 per ton; anthracite and bituminous coal and coke, 12 percent, subject to a maximum increase of 40 cents per net ton; lignite, 6 percent, subject to a maximum of 20 cents per net ton; sand, gravel, stone, broken, crushed or ground, slag, oyster, clam or mussel shells, in open-top cars, 12 percent; iron ore, 12 percent; and charges for handling iron ore either at upper lake ports, or lower lake ports, 15 percent. Water carriers were granted the same increases.

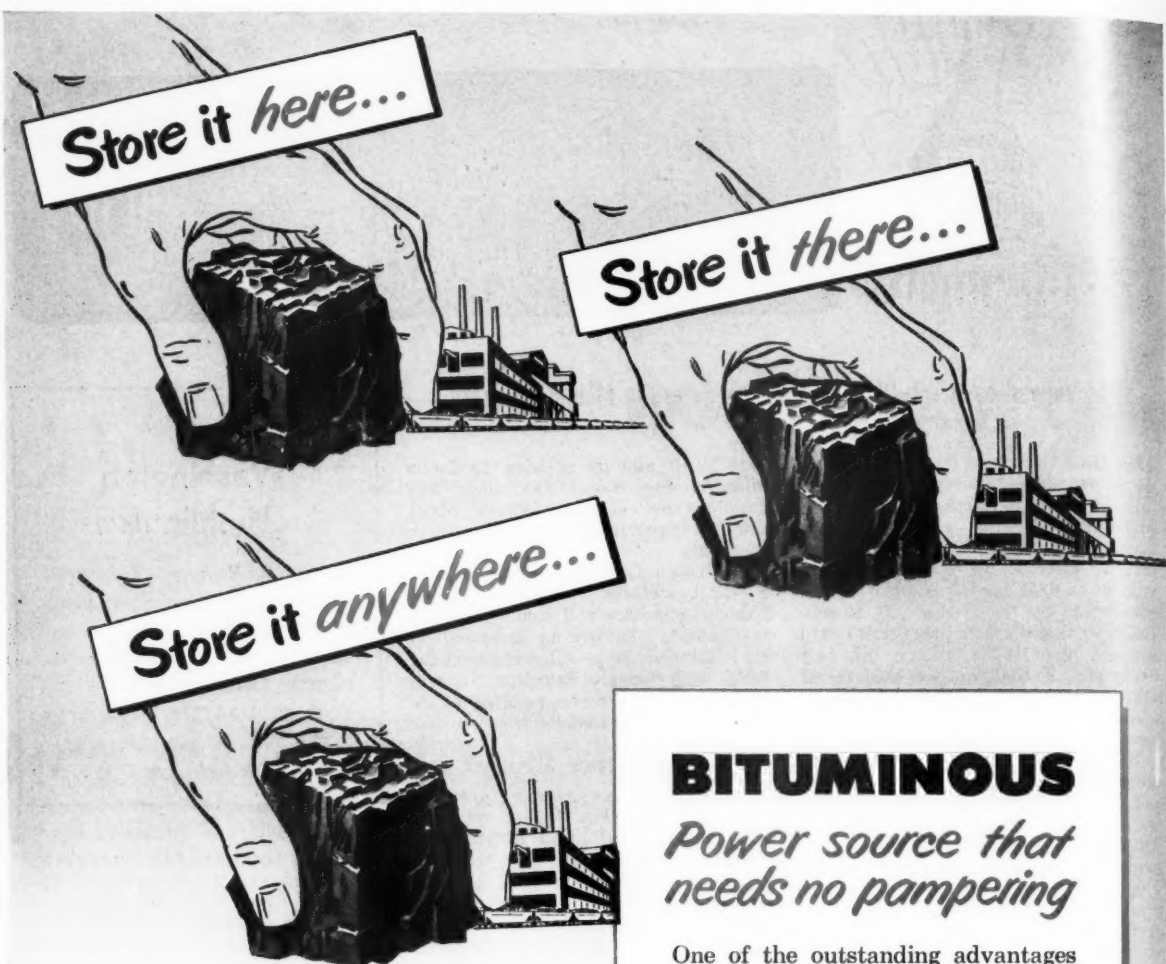
Coal Mine Inspection

There has been no further action on the previously reported Neely (Dem., W. Va.) Federal Coal Mine Inspection bill, which is pending on the Senate calendar.

On the House side, Representative A. B. Kelley's Education and Labor subcommittee has drafted a measure known as the McConnell (Rep., Pa.) bill, on which further action is anticipated in the near future. Representative McConnell is the ranking minority member on the House Education and Labor Committee. His bill replaces the measure by Representative Price (Dem., Ill.), which was identical with the Neely bill.

The McConnell bill does not give the Bureau of Mines power to promulgate

(Continued on page 69)

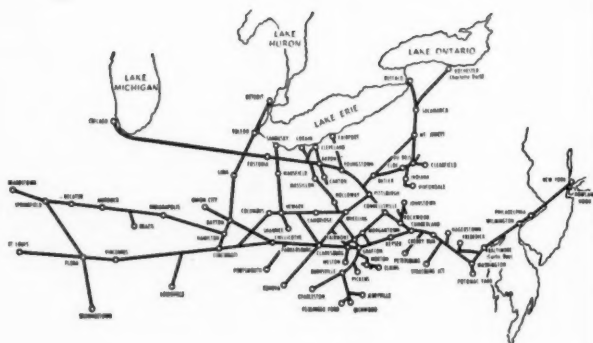


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With the *Defense Agencies*

By HARRY L. MOFFETT

THE President's peremptory seizure of the steel mills has cast a shadow over the wage-price control program and has created an uncertainty as to the Defense Production Act and its controls over industry. Strong public and industry sentiment for an easing of controls is likely to bring Congressional action toward writing a decontrol formula in any new law.

New Price Control Policies

The Office of Price Stabilization, prodded by the Senate Banking Committee, has announced that it will pursue the following policies in "suspending" price ceilings: (1) it will not "decontrol" commodities but will "suspend" ceiling price regulations or lighten reporting or record-keeping requirements, (2) it will not suspend price ceilings where such action would result in levels of prices or margins higher than permitted by existing regulations, and (3) it will terminate the suspensions before prices rise to ceilings. OPS also said it will establish machinery to watch for price rises and will provide for levels at which the ceiling controls would automatically be reimposed.

On the basis of these policies, the pricing agency has already suspended the ceiling price regulations on 16 commodities, primarily in the agricultural field.

OPS has also adopted a new price ceiling increase standard, known as the "product standard," under which a manufacturing industry losing money on a particular product or product line may obtain price relief. This standard "requires that the ceiling price for a particular product be high enough to cover the average total cost of producing and distributing that product."

In recent actions OPS has issued regulations (1) permitting smelters and refiners who process copper, lead and zinc ores for others to adjust their ceiling prices for service charges to reflect added costs incurred since July 1, 1951 in accordance with contracts entered into before January 26, 1951, or renewed since then upon the same terms, and (2) exempting from price control sales of iron ore between affiliated corporations.

Minerals Production Expanded

During the past few weeks the Defense Materials Procurement Agency has concluded agreements for the expansion of domestic production of copper, manganese and zinc.

DMPA has agreed to pay over-the-ceiling prices for copper from the Christmas Mine in Gila County, Arizona and the Antler Mine at Yucca, Ariz. The former agreement has a two-year term and guarantees a price of 31.6 cents per pound, while the latter agreement continues until November 30, 1954, unless sooner terminated upon 60 days' notice by either party and guarantees a price of 34.355 cents per pound. Both agreements terminate automatically in the event price controls are dropped.

Under terms of a contract between DMPA and Vernon C. Davis of Linden, Wis., domestic production of zinc will be increased by 1500 tons annually. The Agency has agreed to purchase up to 3000 tons of slab zinc from Davis at a price of 15½ cents per pound. The contract runs for three years and the increase will be brought about through the construction by Davis of additional concentrating facilities.

Two domestic manganese expansion

contracts have also been negotiated by DMPA recently. Under one, the Government will advance the Westmoreland Manganese Corp. of Batesville, Ark., \$3.8 million against production from ore deposits near Cushman, Ark. The company will complete a washing plant, which is expected to be ready in 8 months. Processed ore produced during the first four months of operation, up to 8000 tons, will be purchased at the rate of \$1.67 or \$1.72 per unit of contained manganese, and during the following six months at a price of \$1.37 or \$1.42, depending on grade. Under the other manganese agreement, made with the Electro Manganese Corp. of Knoxville, Tenn., the company will expand its facilities with a \$2.2 million Government advance. DMPA will purchase up to 36 million pounds of the metal, at a discount, provided the company cannot sell it to other consumers at regular prices.

Meanwhile the Defense Minerals Exploration Agency has disclosed that it has certified discoveries of tungsten in California, mica in North Carolina, and manganese in Arkansas, the first three discoveries announced under the exploration program.

Access Roads Projects

In order to help get strategic and critical minerals and metals to market, DMPA has approved 45 projects for construction of mine access roads. Under these projects a total of 1254 miles of roads at an aggregate cost of about \$6 million will be built in mining regions in ten States. Some of the roads have been completed while others are either under construction or due to be started soon. The Agency has estimated that about

(Continued on page 73)

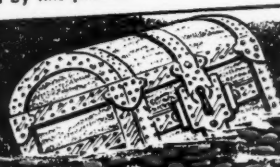
All TREASURE *isn't buried in Sand!*

Millions of tons of marketable coal are lying on top of the ground already mined in vast slurry ponds. The C-M-I Continuous Centrifugal Dryer can help you to turn this treasure into salable coal.

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Reduces Water Content. The C-M-I Dryer reduces the surface moisture of newly washed coal. It takes off the greatest volume of water thereby reducing the cost of heat drying, the more expensive method.

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Efficient—The C-M-I Dryer will reduce the water content of 28 tons of slurry from 82% to 7½% in less than one hour!

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✓
YES NO

Capacity—The large C-M-I Dryer will handle as much as 75 tons of ¾" x 28 mesh coal per hour, reducing the water content from 25% of surface moisture to 6% or less.

✓
YES NO

Durable—All parts are made of the best metals obtainable. Revolving parts are dynamically balanced on the latest type of balancing machine.

✓
YES NO

Economical—In many instances, the C-M-I Dryer eliminates costly heat drying normally required.

✓
YES NO



If you are interested in how your dewatering problems may be solved with a C-M-I Dryer, write to us, stating the sizing of the coal, such as the percentage on 8 mesh, 10 mesh, 20 mesh, 35 mesh, 65 mesh and 100 mesh standard Tyler screens, and also the amount passing through 100 mesh. We will make our recommendation at no cost to you.

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The appointment, effective March 1, of Oscar A. Glaeser to the post of assistant general manager of western operations, U. S. Smelting Refining and Mining Co. was announced recently by W. C. Page. Glaeser joined the U. S. Smelting organization as safety engineer in 1936. In 1942, he was appointed industrial relations manager and in 1950 he was advanced to assistant to the vice-president and general manager, the position he held until his recent promotion.

William C. Myles, real estate agent in the Mobile, Ala., district for Tennessee Coal and Iron Division of U. S. Steel Co., has been made manager of Mobile operations. He will be responsible for all TCI interests and activities in the area, including the terminal facilities to be installed at the Turner Terminal Site there.

W. R. McCormick, Jr. recently became superintendent in charge of the Calera Mining Co. refinery at Garfield, Utah.

Texas Gulf Sulphur Co. has announced the resignation of P. George Maercky, because of ill health, as vice-president of the company. It also announced the election of E. F. Vanderstucken, Jr. as secretary.



Blucher Frank Allison of Harlan County, Kentucky, recently receiving a gold watch as winner of the Old Timers' award, a presentation made annually to outstanding students of mining engineering. Allison attends the University of Kentucky. Presenting the award is Dr. Charles E. Lawall, assistant vice-president of the Chesapeake and Ohio Railroad.

A. H. Featherstone, president of Golconda Lead Mines, Inc., has announced the election of Harry F. Magnuson as secretary-treasurer and director of the mining company. He succeeds W. H. North, who recently resigned.

Harold A. Krueger, production manager of St. Louis Smelting and Refining Co., has announced the promotion of R. F. Moe to general superintendent of the company. He has been assistant superintendent of the St. Louis mines for several years.

On April 1, A. E. Vandale was appointed division superintendent of Westland Division of the Pittsburgh Coal Co., Division of Pittsburgh Consolidation Coal Co. Prior to his appointment, Vandale was division engineer of the Westland and Central Division of Pittsburgh Coal. J. J. Seiler was appointed to this position, succeeding Vandale. Seiler formerly was superintendent at several of the company's stripping operations.

B. E. Hurdle has been appointed general superintendent and P. S. Barratt has been named superintendent of the engineering department of Consolidated Mining and Smelting Co.'s Kimberly operations.

Cris Dobbins, formerly executive vice-president and general manager of Ideal Cement Co. with home offices in Denver, Colo., has recently been named president of the company. In addition to plants previously established in nine southern and western states, Ideal Cement Co. has recently acquired additional facilities in California and Oregon.

At a recent meeting of the Board of Directors of Pierce Management, Inc., the following changes in officers were made:

James H. Pierce resigned as president of the company and assumed the duties of chairman of the Board of Directors. John S. Marshall, formerly executive vice-president, was elected president of the company.

F. L. Rousselle, formerly treasurer and secretary of the company, resigned his position as secretary and assumed the duties of executive vice-president and treasurer.

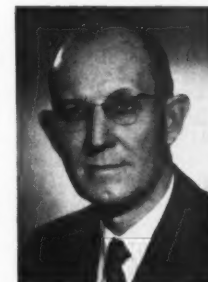
T. J. Welby was elected to position

of secretary, in addition to his duties as assistant treasurer.

Stuart St. Clair and Evan Bennett have returned from a six-month investigation of Burma mineral deposits for Pierce Management, Inc., and William W. Tamplin. Kenneth A. Lambert and Sam Hancock have taken up two years' residence there to continue the project.

A. L. Roberts has resigned as general superintendent, Franklin County Coal Corp., Royaltown, Ill., and has been succeeded by M. M. McCormick, formerly associated with Consolidation Coal Co. (Ky.)

The election of Noel S. Worrell to the office of vice-president in charge



of traffic was announced recently by Howard I. Young, president of American Zinc, Lead and Smelting Co.

Worrell joined the American Zinc organization at Columbus, Ohio, in 1920, where he served in Traffic and Sales for a number of years. In 1934 he was appointed Central District sales manager and assistant traffic manager at Columbus, and since 1941 he has been general traffic manager of American Zinc at St. Louis, Mo.

Russell D. Squibb has joined the West Virginia Coal & Coke Corp. as industrial engineer with headquarters in Omar, W. Va.

Michael G. McGrath, superintendent of the Salt Lake City uranium mill of the Vitro Chemical Co., has resigned to take up work as a consultant in uranium mining and milling problems.

Richard M. Griffith has been transferred from superintendent of Mine No. 43 to superintendent at Mine No. 40 by the Peabody Coal Co. Glenn Dodd succeeds Griffith as superintendent at Mine No. 43.

Frank McKinley left the employ of Bunker Hill & Sullivan Mining & Concentrating Co. effective February 1 to take the position of plant superintendent—Jacksonville Plant of the Humphreys Gold Corp. in Jacksonville, Fla.

J. A. Willis, Jr., vice-president of the Coalburgh-Kanawha Mining Co., has announced that John E. Moore is now mine superintendent for the company. Moore was formerly employed by the Ames Mining Co. as mine foreman at the Freese mine, Ethel, W. Va.

George R. Schaefer has been appointed general manager of Minas de Matahambre, Pinar del Rio Province, Cuba. Schaefer worked underground at Matahambre during vacations before his graduation from Lafayette in 1936. He then joined the company as junior engineer. Promoted to mine foreman in 1940, assistant mine superintendent in 1942, mine superintendent in 1944, he became assistant general manager in 1948.

According to a recent announcement Robert E. Kamm has been named superintendent of the Peters Creek Coal Co.

P. L. Lockridge, formerly general superintendent of the Torreon Smelter of the American Metal Co., has been named superintendent of the smelter at Socavon in the State of Querétaro, Mex., for Compañía Minera Esmeralda, S. A.

Alwin F. Franz has been elected president of the Colorado Fuel & Iron Corp. Franz, who has been executive vice-president of the firm since 1949, and a director since 1948, replaces Carl W. Meyers, who was elected vice-chairman of the board of directors.

Harmon E. Keyes has accepted appointment as consultant for Cyprus Mines Corp. He expects to leave for Cyprus very shortly to supervise the inauguration of the company's new autoxidation acid plant.

George W. McCaa is now general manager of operations for the Jamison Coal & Coke Co. George Judy has replaced McCaa as general superintendent of Consolidation Coal Co. (W. Va.)

George L. Ratcliffe was recently elected a vice-president of National Lead Co. Ratcliffe has been a member of the board of directors since 1948.

Robert F. Duemler has been elected vice-president of West Virginia Coal & Coke Corp. with headquarters in Cincinnati, Ohio. Duemler was formerly vice-president of the Delaware, Lackawanna & Western Coal Co. of New York and more recently of W. R. Grace Co. of New York.

William R. Dice was recently elected to the Board of Directors of the Eagle-Picher Co. to succeed the late Vincent H. Beckman. Dice, who is vice-president and comptroller, has been associated with the company since 1928.

Carlos Payne, a tippie man, and James Morgan, an underground worker were recently elected directors of the Miners Coal Co. operating the non-union Fies Mine near Madisonville, Ky. Justin Potter, president of the company, announced that the

secret ballot election of the two by their fellow workers was part of a plan to bring workers and public into closer relationship in management and operations. Will Caldwell is the public director elected. In addition to these three and Potter, J. Davis, secretary-treasurer and Kenneth Snarr, vice-president and general manager were also elected to the board.

On March 19, Edward B. Greene, chairman of the board of the Cleveland-Cliffs Iron Co., announced the appointment of John S. Wilbur as manager of the Ore Sales Department. He succeeds W. McKinnie Green who died March 13.

Wilbur graduated from Yale University in 1933, joined Cleveland-Cliffs in 1940, and served in the Field Artillery from 1941 to 1945 when he rejoined the Cleveland-Cliffs Iron Co. He was made assistant manager of the Ore Sales Department in 1950.

William F. Diamond, formerly manager of the Kentucky Elkhorn Division of the Pond Creek Pocahontas Co., has been named chief engineer, Island Creek Coal Co. David E. Bayer, manager, Marianna Smokeless Coal Co., has succeeded Diamond.



JOHN S. WILBUR

Milton Englund has been promoted to assistant superintendent at the South Agnew and Morton Mines, Mesabi range by the M. A. Hanna Co. He succeeds Robert F. Anderson, who has been transferred to the ore sales department of the Hanna Co.

Woods G. Talman has been named assistant general superintendent for the Gary, W. Va., and Lynch, Ky., districts of the U. S. Steel Co. Coal Division with headquarters in Gary. He replaces Lloyd Lineberry who has been appointed district superintendent for West Virginia mines.

Expansion programs of the Combined Metals Reduction Co. in Utah and Nevada have brought about five important staff promotions, it was announced by E. H. Snyder, president and general manager.

Sam S. Arentz, general superintendent at Pioche, Nev., is advanced to manager of Nevada operations. C. E. Bartlett, assistant to the general manager, becomes director of Utah and Nevada milling operations, and Paul Gemmill, geologist in charge of engineering at Caselton, Nev., is appointed general superintendent of mines.

W. G. Fidler, mill superintendent at Caselton, is put in charge of all Nevada milling operations including the Panacalite perlite processing plant, as general superintendent of milling. Frank H. Anderson, chief clerk at Pioche, is advanced to office manager of Nevada properties.

— Obituaries —

Calvin Holmes, 74, president of the Holmes-Darst Coal Corp., and a widely known and respected executive in the industry, died of a heart ailment on February 23 in Knoxville, Tenn. Among other positions in the coal industry Mr. Holmes was a director of the National Coal Association and Appalachian Coals, Inc.

Robert E. Whitteker, secretary and director of purchases, Kanawha Manufacturing Co., died recently in Charleston, W. Va.

Funeral services were held recently at Rock Springs, Wyo., for James M. Sampson, 73, former chief mine inspector for Wyoming. He was a native of Ayrshire, Scotland, coming to the United States in 1903.

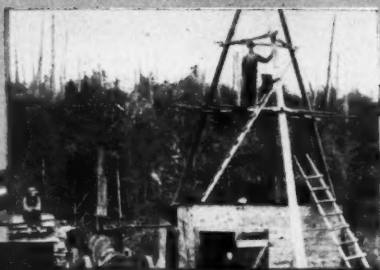
On March 13, 1952 William McKinnie Green, who had been manager of the Ore Sales Department of The Cleveland-Cliffs Iron Co. since May, 1950, died in the Tampa Hospital in Tampa, Fla. Mr. Green was born in Cleveland, Ohio, on June 10, 1889, attended University School, and grad-

uated from Yale University in the class of 1910. He joined the Cleveland-Cliffs Iron Co. in their Ore Sales Department in April 1911.

William H. Ferguson, 85, died in Denver March 20. Mr. Ferguson came to Denver in 1903 and operated coal mining properties in Colorado and New Mexico. From 1907 to 1925 he was in charge of fuel properties for the Denver and Rio Grande Western Railroad. Since then he had been interested in the development of coal, potash and other holdings in Colorado and New Mexico.

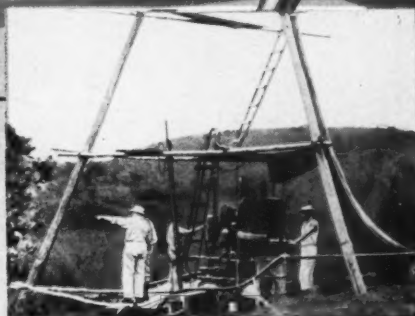
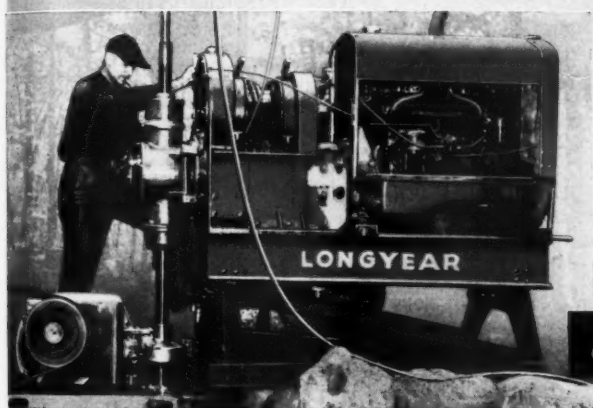
Tom Rush Ragland, 79-year-old retired coal operator, died recently at his home in Beckley, W. Va. Before disposing of his coal interests in 1937 Mr. Ragland served as manager of the Gauley Consolidated Coal Co.; organizer of the Forky Pines Coal and Coke Co. of which he was president and general manager for eight years; vice-president and general manager of the West Virginia Coal Mining Co.; organizer of the Ragland Coal Co.; and treasurer and later vice-president of Raleigh Smokeless Fuel Co.

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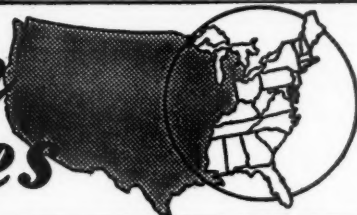
REPRESENTATIVES IN PRINCIPAL MINING CENTERS IN THE UNITED STATES AND OTHER COUNTRIES

NEWS

and VIEWS



Eastern States



Honor Mines Director

The Annual Mineral Industries Banquet of Pennsylvania State College was held on March 22, in honor of John J. Forbes, director, U. S. Bureau of Mines. Robert L. Laing, executive secretary of the Central Pennsylvania Coal Producers' Association, acted as toastmaster. The banquet, at which Forbes gave the principal address, was arranged in its entirety by the Mineral Industries Student Council.

A highlight of the occasion was the presentation of a scroll honoring Mr. Forbes in recognition of his 40 years of distinguished services to the cause of mine health and safety which culminated in his appointment to the directorship of the U. S. Bureau of Mines.

Form Sales Office

The Pennsylvania Coal & Coke Corp. has formed a subsidiary organization to be known as the Pennsylvania Coal & Coke Sales Corp. This new subsidiary will conduct a wholesale business for the sale of anthracite, and low, medium, and high volatile bituminous coals.

Join in Titanium Research

The Glidden Co. and Bohn Aluminum & Brass Corp. have joined hands in efforts to develop a method for producing pure titanium metal, its compounds and alloys, and in fabrication of ductile titanium and its alloys. Research facilities of the two com-

panies will be pooled for the joint project. Glidden's laboratories in Baltimore and the Bohn Aluminum laboratories in Detroit will be the scene of these experiments.

Both Glidden and Bohn have been working independently on titanium research for some time and have passed the preliminary phases, a joint announcement said.

Move Limestone Office

The Michigan Limestone Division of U. S. Steel Co. closed its executive offices at New Castle, Pa., early in April. Personnel have been moved to other offices.

Michigan Limestone operates various limestone properties, to supply U. S. Steel blast furnaces and steel plants.

Coal Companies Merge

Operating companies under the management of Herbert E. Jones, president, Amherst Fuel Co. in Logan County, W. Va., will hereafter be owned and operated by Amherst Coal Co. The Kanawha County and Cincinnati properties will continue to be operated by Hatfield-Campbell Creek Coal Co. as a subsidiary of Amherst Coal Co.



Red Blood from Red Metal People

An American Red Cross Bloodmobile recently visited Anaconda Copper Mining Co., at its 25 Broadway headquarters where 139 pints of blood were donated by employees of Anaconda and subsidiary companies. Fifty percent of this total will be given to the armed forces. The other half will be credited to the Anaconda organization's blood bank for emergency use by New York office employees and their families.

End Coal Export Licensing

Allocation and licensing of coal exports from the U. S., required since November 1, 1951, ended April 1. Lower estimates of coal requirements from the principal importing countries, and the easing of the shipping shortage and port congestion in this country are the main reasons for the move.

Extremely heavy demands for American coal last November put heavy pressure on available shipping and port facilities. The licensing program was begun to insure that other free nations would receive an equitable share of essential supplies of coal.

Celebrate Safety Record

Pond Creek Colliery, Pike County, Ky., and Howard Collieries, Mingo County, W. Va., of the Norfolk and Western Railway Co. celebrated their 25th annual safety competition with a dinner meeting on April 1.

The safety record for the Pond Creek Colliery shows that, for the four mines of the district, only one lost-time accident occurred during the production of 675,336 tons of coal with 1,239,820 man hours of exposure. This resulted in an overall frequency rate of 0.80 and a severity rate of 0.12.

Honored at the dinner were foremen who had completed from two to 11 years with unblemished safety records.

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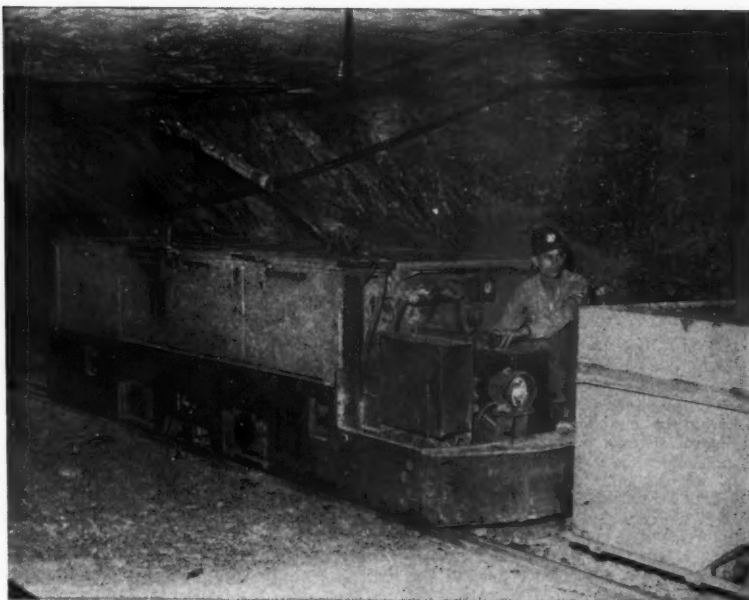
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STORAGE BATTERIES



Frank Bevins, Jr., right, a Grundy (Va.) high school boy who contemplates a career in coal mining, visited J. J. Forbes, director, U. S. Bureau of Mines, in Washington, D. C. Young Bevins was in the Nation's Capitol through the courtesy of his father's employer, the H. E. Harman Coal Corp., and because the youth had gained national recognition for a prize-winning letter in a contest on "How I Can Help Expand Opportunity in America." The boy's father is a mine electrician. The young man's essay was based on his desire to study engineering in college and then join the technical side of the coal industry. His two-day tour of Washington (April 24-25), which was conducted by the Bituminous Coal Institute, also included a visit with U. S. Senator Harry F. Byrd of Virginia.

Build Coal Dock

A new coal barge loading dock will be built for Powhatan Mining Co. by the Contracting Division of Dravo Corp., at Dilles Bottom, on the Ohio River a few miles upstream from Powhatan Point, Ohio, it has just been announced.

The dock will facilitate loading river barges with coal from nearby mines for transportation to users and rail transfer points.

Steel sheet piling will be used to construct one foundation cell of 26 ft diameter for unloading equipment, one ice breaker cell 25 ft in diameter, two 16 ft diameter barge shifter cells, two 14 ft diameter mooring cells and four smaller mooring posts.

W. Va. Tops In Coal Production

For the first time in history, West Virginia has forged ahead of Pennsylvania as the leading coal-producing state of the nation.

The Mountain State is now in the No. 1 position in the U. S. by virtue of its big production of 162,606,000 net tons of bituminous coal in 1951. No anthracite is produced in West Virginia, yet last year it led its nearest competitor, Pennsylvania, by more than 12 million tons in total coal production.

Pennsylvania in 1951 had an output of 150,129,000 tons of coal—108,520,000 tons of bituminous plus 41,509,000

tons of anthracite—and, as a result, continues to be a major producer of solid fuel despite having relinquished its long-time lead to West Virginia.

Together—in 1951—Pennsylvania and West Virginia accounted for more than half of the coal mined in the United States: 312,825,000 tons, a mountain of fuel that provided the keystone of the nation's industrial might. Their contribution was 54 percent of the U. S. grand total of 576,509,000 tons of coal, both bituminous and anthracite.

Safety Association Meets

On April 22, 1952, the annual meeting of the Joseph A. Holmes Safety Association was held in Washington, D. C. At the meeting applications for Hero Awards were screened and eight recipients were selected for these awards. This compares with six hero awards given last year. Joseph A. Holmes Hero Awards are given to individuals engaged in the mineral extractive industry for acts of heroism which are considered outstanding by the Association.

This year also, 408 Safety Awards are being given. These are given to mines, mills and smelters for outstanding safety records and to individuals

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who have worked 40 or more years in the industry without a lost-time accident.

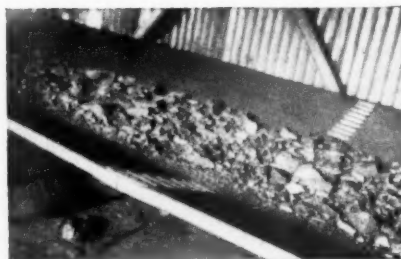
It was announced at the meeting that the National Mine Rescue and First-Aid Contests, inaugurated in 1951 after a lapse of 20 years, will be continued on a biennial basis. There will be no contest in 1952 but the next will be held during the fourth week in September, 1953, at a location to be selected later.

Coal Miners Wages High

The average weekly earnings of bituminous coal miners in January were \$86.99, a new all-time high, according to figures released by the U. S. Bureau of Labor Statistics. The average number of hours worked

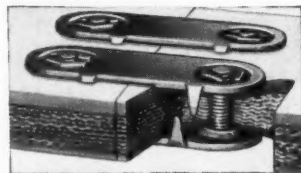


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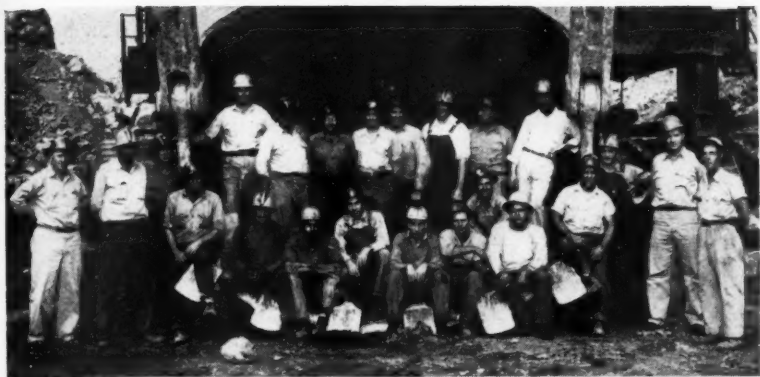


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Last year, an unofficial world's record for the amount of dirt moved in one month was set by the crew at 46-A pit of the Hanna Coal Co. division of Pittsburgh Consolidation Coal Co. The crew moved 1,505,143 cu yd. Shown in the picture are the morning and afternoon shifts posing in the 46-cu yd bucket of the stripping shovel which is operating near Cadiz, Ohio

weekly by the bituminous miners was 38.8 for that month.

The January weekly earning figure is 49.9 percent higher than the average weekly wage in 1946, the first post-war year. It is 264.3 percent higher than the average weekly earnings of bituminous coal miners in the pre-war year of 1939. The Bituminous Coal Institute, in reporting this comparison, pointed out that the advance in the cost of living, according to B. L. S. figures, was 35.6 percent since 1946, and 90.2 percent since 1939.

The bituminous coal industry has a working force of roundly 400,000 men, and they are the highest paid of any major category of industrial workers reported by the U. S. Bureau of Labor Statistics. The \$86.99 in January was \$19.91 higher than equivalent earnings for workers in manufacturing industries, whose average weekly wage is shown by the B. L. S. report to be \$67.08 for that month.

National Lead Buys Nicaro Unit

Joseph A. Martino, president of National Lead Co. has announced the acquisition by his company of a majority interest in Nickel Processing Corp., operator of the Government-owned nickel plant at Nicaro, Cuba. Mr. Martino indicated that National Lead Co. and Fomento Minerales de Cuba have purchased N. V. Billiton Maatschappij's interest in the Nickel Processing Corp. and rights to certain processes which may further expand the output of the plant.

In February of this year, Jess Larson, administrator of General Services announced the resumption of nickel production at Nicaro. The unit was closed down after World War II and has been reactivated to provide vital nickel for the nation's defense industry. Full production at a rate of about 30,000,000 lb of nickel per year is scheduled to begin in June.

Nickel Processing Corp. is presently

conducting tests, on a pilot plant basis, which hold promise of increasing the capacity of the present facilities and also permitting the recovery of cobalt from the ores treated at Nicaro. Cobalt is likewise essential to the defense effort and National Lead Co. has under construction at the present time a plant unit at Fredericktown, Mo., which will also produce this metal.

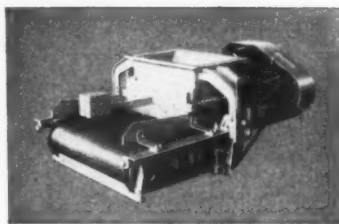
Release Film List

A new reference list of motion picture films on coal and related subjects has been compiled by the Educational Department of the Bituminous Coal Institute, 320 Southern Bldg., Washington 5, D. C., for the use of educators and others interested in visual presentations depicting the bituminous coal industry.

BCI's three films—the new "Powering America's Progress," filmed by the March of Time; "The Magic of Coal" and "Underground Adventure"—head the list. All are 16mm., sound pictures, and are available on a loan basis from BCI. "Powering America's Progress," which is in Kodachrome, is also available from the Graphic Services Section, Bureau of Mines, U. S. Department of the Interior, 4800 Forbes St., Pittsburgh 13, Pa. None of the other films listed—28 in all—are available from BCI, but may be applied for at the offices of the respective companies whose addresses are given in the list.

Motion pictures produced for or by coal-carrying railroads, manufacturers of mining machinery, suppliers to the coal industry, coal companies, coal-burning equipment manufacturers, several of the coal-mining states (Illinois, Ohio, West Virginia, and Wyoming), Anthracite Institute, Coal Producers Committee for Smoke Abatement, Association of American Railroads, and British Information Services are included and described in the BCI directory of films.

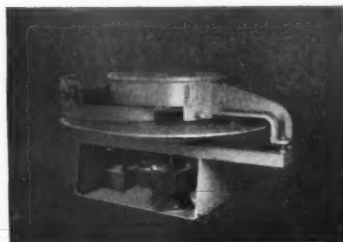
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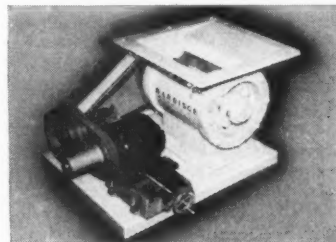
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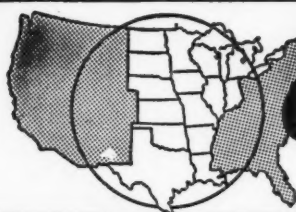


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Central States

Zinc Institute Meets

On April 20 and 21, 350 representatives of mining and smelting companies with operations throughout the United States gathered for the thirty-fourth annual meeting of the American Zinc Institute at St. Louis, Mo. Discussions during the two-day meeting centered on the nearby and long range prospects for zinc production and consumption. At the opening session on Monday morning, Jess Larson, administrator of the Defense Materials Procurement Agency, discussed the policies and objectives of this agency and its progress toward the establishment of the various commodity programs which seek to supply enough minerals and other materials to support the defense effort and the civilian economy.

John Sellon, deputy director of the Tin, Lead and Zinc Division, National Production Authority, discussed zinc and Government controls. In his talk Sellon stated that preliminary steps are under way for revocation of zinc controls.

Slab zinc production and consumption in 1952 was reviewed by C. R. Ince, vice-president, St. Joseph Lead Co. He pointed out an increased trend toward favorable balance between supplies and requirements, with domestic production and imports geared to satisfy all demands during the balance of the year. Another speaker, J. L. Hamilton, Jr., of the Granite City Steel Co., spoke on the outlook for galvanized sheet steel production which he predicted will increase in 1952.

Tom Lyon, director of the Domestic Expansion Division of the DMPA led off a round table discussion by reporting on the DMPA program and its bearing on future production. Other prominent mining men contributed to the discussion by reviewing developments and expansion in their respective mining areas. The consensus of all reports indicated increased production in 1952.

In reviewing the world zinc situation on Tuesday, Simon D. Strauss, vice-president, American Smelting and Refining Co., said that, according to current estimates world mine production in 1952—outside Iron Curtain countries—will probably amount to 2,418,000 short tons of recoverable zinc from which it is estimated 2,300,000 tons of primary metallic zinc and zinc

in the form of oxides and other similar products will be extracted. This is the first time since 1946, he said, that world mine production promises to exceed the smelter and pigment producers' needs.

Create Water Supply

The Freeport Sulphur Co. has developed a new process which will make it possible to use sea water in mining its new sulphur deposit at Bay Ste. Elaine, La. Because there are no sources of fresh water near Freeport's new property, engineers have devised a method passing sea-water through packing and treating it with flue gases from steam boilers to remove the oxygen present in the water. They believe that this will reduce the corrosion usually caused by salt water to the point where it can be used to mine sulphur.

Uranium From Phosphate

The AEC has disclosed that it has contracted with Texas City Chemicals, Inc., Texas City, Texas, to buy uranium recovered as a byproduct in the treatment of phosphate rock. The new contract is part of a general effort by AEC to step up domestic production of uranium by taking advantage of the occurrence of uranium in certain phosphate rocks in Florida and some western states.

An increasing number of phosphate fertilizer companies have been investigating the possibility of recovering uranium from phosphoric acid produced in the manufacture of fertilizers and phosphate chemicals. Although the amount of uranium in these phosphate rocks is quite small, the large tonnages mined each year makes the recovery of byproduct uranium worthwhile.

Bentonite Spurs Activity

The bentonite industry at Belle Fourche, S. Dak., has developed to the extent that three companies are located near there, working deposits. They are The American Colloid Co., International Minerals and Chemical Corp., and Baroid Sales Co. In 1951 there were 9575 carloads of bentonite shipped from Belle Fourche, a daily average of about 20 carloads.



"Dropped my sample case!"

—The Washington Daily News.

Mine 58 Worked Out

Stuyvesant Peabody, president of Peabody Coal Co., has announced the closing of Mine 58 at Taylorville, Ill., at the end of March. Mine 58, the oldest of the Peabody mines, had been in continuous operation since 1900, and had reached the end of its productive life.

The closing of Mine 58 is part of a program instituted by Peabody several years ago whereby old uneconomical mines are being abandoned as new properties are put into operation. In the central Illinois area Mine 17 at Pana, with a daily capacity of 11,000 tons, was recently completed. Mine No. 10, to be completed during the fall of 1952, will produce 13,200 tons per day and a similar mine to be known as No. 11 will follow.

It is Peabody's plan to shift as many employees as possible, from the closed mine to the new ones.

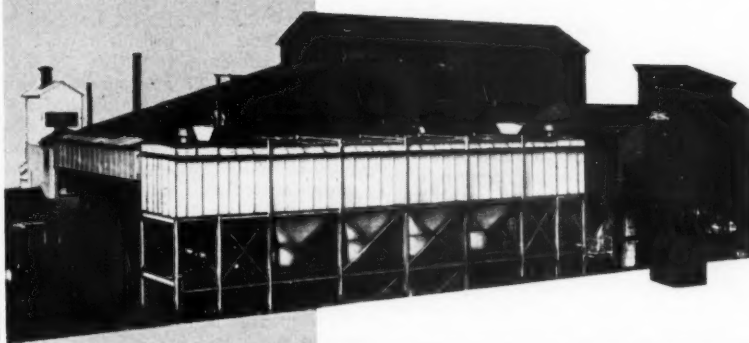
Plan Large Taconite Project

A large-scale development in Minnesota for producing up to 10,500,000 tons annually of iron ore pellets from taconite is under consideration by Erie Mining Co. Erie is owned by Bethlehem Steel Corp., The Youngstown Sheet and Tube Co., Interlake Iron Corp. and Pickands Mather & Co.

An application for a certificate of necessity covering the entire project on a basis of 10,500,000 tons, estimated to cost about \$300,000,000, has been filed with the Defense Production Administration. Final decision to undertake the development depends upon the action taken by the Government on the company's application and the solution of certain tax problems, according to Elton Hoyt 2nd, president of Erie and senior partner of Pickands Mather & Co.

The program calls for constructing a plant on the Mesabi Range northeast of Aurora, Minn., to produce the concentrated iron ore pellets from taconite. It also calls for building a new community east of Aurora for the plant employees and their families, a large power plant, and a railroad

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to carry the pellets from the plant to docks and loading facilities at Two Islands, Minn., on the north shore of Lake Superior.

If the project is undertaken, the initial unit would have an annual capacity of at least 5,000,000 tons, Hoyt said, which would probably take about four or five years to attain. According to present plans construction of additional units would continue until production is at the rate of 10,500,000 tons per year. This procedure would assure maximum production at the earliest possible date.

Erie Mining Co. for several years has operated a preliminary taconite plant at Aurora for experimental purposes. Last year about 70,000 tons were produced and shipped.

Develop Uranium Claims

Kerr-McGee Oil Industries of Tulsa, Okla., has signed a contract with the Patrick T. Henry Corp. to explore and develop uranium claims in Sevier County, Utah. The Oklahoma firm will lease some 35 claims in the Big Rock Candy Mountain and Marysvale districts in west Utah.

Set Sulphur Production Record

Production of sulphur by Freeport Sulphur Co. in the first quarter of 1952 was the greatest in any quarter in the company's history, Langbourne M. Williams, Jr., president, told the board of directors recently.

Total output of Freeport's sulphur operations in the quarter reached 413,000 long tons, Williams said. The great bulk of this tonnage was supplied by the company's Grande Ecaille mine, located at Plaquemines Parish, La., which is producing at almost twice the World War II peak and nearly three times the pre-war level.

For Metallurgical Research

An upsurge of interest in industrial scientific research in the field of metallurgy has brought about the establishment of a department of metallurgy at Southwest Research Institute, Dr. Harold Vagtborg, president, has announced.

Appointed to head the department is Dr. Robert J. Anderson, who was awarded a Doctor of Science degree by the Massachusetts Institute of Technology, and who has had 35 years' experience in industrial, government and educational fields.

The department is undertaking industrial metallurgical research in foundry practice, process metallurgy, and physical metallurgy, in addition to problems in metal economics.

Honor Homestake

The Homestake Mining Co., was honored on Arbor Day for the second time in the past five years for the scientific management of its timber lands. Certification was made on Arbor Day, under the South Dakota Tree Program. The first time the company was recognized for its timber operations was at Nemo, S. D., in 1948, at the 50th anniversary of the Black Hills National Forest. The first sale of timber from any national forest was made to Homestake, near Nemo, in 1898.

Repair Locomotives

A diesel locomotive repair shop building is being constructed at Virginia, Minn. for the Oliver Iron Mining Co. Housing three repair tracks, the shop, when completed early next summer, will service all Oliver diesel-powered railroad equipment in the eastern Mesabi District.

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BOOK REVIEW

GEOLOGIC GUIDEBOOK OF THE SAN FRANCISCO BAY COUNTIES, *State of California, Department of Natural Resources, Division of Mines, Ferry Bldg., San Francisco 11, Calif.; 392 pages, clothbound, \$2.50.*

ISSUED as Bulletin 154, this guidebook covers the history, landscape, geology, fossils, minerals, industry and routes to travel in the mine counties of California bordering on San Francisco Bay and the three counties in the delta region of the San Joaquin and Sacramento Rivers.

To those who remember the first guidebook in the series, "GEOLOGIC GUIDEBOOK ALONG HIGHWAY 49," this companion volume will need no introduction. Like its predecessor, it deals with a region that contributed greatly to the color and character of the West. Each of the 32 authoritative articles that comprise the book were prepared by a technical expert but are written in an easily understood manner and are grouped into seven logical parts. These are: historical background, history of the landscape, geologic history, prehistoric life, mineral industry, water and places to go and routes to travel. Because the 392 text pages and 300 illustrations cannot present an exhaustive study of all the topics covered, nearly

all the articles append a bibliography to serve as a starting place for further reading.

All in all, Bulletin 154, the San Francisco Bay area guidebook, is an interesting and valuable addition to the series so auspiciously begun with "Along Highway 49."

INTRODUCTION TO GEOPHYSICAL PROSPECTING. *Milton B. Dobrin, Senior Research Technologist, Field Research Laboratories, Magnolia Petroleum Co. McGraw-Hill Book Co., Inc. Price \$7; 417 pages.*

HERE is a book designed for the professional geologists, mining engineers or executives engaged in exploration whose work involves contact with geophysics and who feel a need for further instruction in the subject. Its approach to all the standard methods is elementary and requires no mathematics beyond trigonometry. For each method covered, the fundamental physical principles, instrumentation, field techniques, reduction of field data and their interpretation are dealt with, in that order. The limitations of each method are considered

and results of actual surveys are presented as examples.

All geophysical methods in common use are discussed, but the principal emphasis is on the gravity, magnetic and seismic techniques. Electrical and radio activity techniques are treated in less detail because of their relatively limited use.

In the chapter on case histories is illustrated the value of applying a combination of geophysical methods for more effective and more economical prospecting than by any one method alone. In the section of this chapter devoted to mining geophysics, the case histories deal with both successful and unsuccessful applications of geophysical prospecting methods.

Dr. Dobrin's work is no weighty tome, but a readable, interesting and valuable book which should be on the shelf of any mining engineer, professional geologist or exploration executive as well as that of students of geology and mining who expect to enter the field of petroleum or mineral exploration. Professional geophysicists who desire a broader view of all phases of geophysical exploration and students preparing for a career in geophysics will also find this an interesting and valuable book.

Wheels of Government

(Continued from page 55)

a safety code or safety regulations, nor to change such code from time to time. Its purpose is directed to the prevention of major disasters resulting from roof falls, insufficient ventilation, coal dust, electrical equipment and fires in underground workings.

Under the bill a Federal inspector may order men withdrawn when, under the minimum safety requirements set forth in the bill, he finds danger that a mine explosion, mine fire, mine inundation, or man-trip or man-hoist accident may occur. Penalties are provided if mine management officials fail to withdraw men from underground areas when ordered to do so by a Federal mine inspector.

Appeals from Bureau of Mines rulings may be taken to a Federal Mine Safety Board of Review, composed of three members appointed by the President, by and with the advice and consent of the Senate. Appeals from final rulings of the Review Board may be taken to U. S. Circuit Court of Appeals.

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Western States

Zinc from Old Silver Mines

The Coronado Copper and Zinc Co. of Los Angeles, Calif., recently completed negotiations for acquisition of several mining properties at Butte, Mont., near Rucker, which were last worked in 1896, it was announced by Blair W. Stewart, vice-president.

The agreement involves the Bluebird, Largey Estate, Monidah Trust and R. J. MacDonald Co. properties and a coalition of interests which bring the properties under unified control for the first time. Negotiations were initiated nearly two years ago.

Stewart and Mostyn Grant, a Coronado company engineer, have been in Butte recently completing preliminary arrangements preparatory to exploration and development. The exploration program will begin as soon as weather conditions are favorable and will be supervised by Grant.

Strip Idaho Phosphate

The San Francisco Chemical Co. plans to begin strip mining operations at its Waterloo phosphate beds this spring, according to general manager D. L. King. Ore will be trucked to the company's mill at Montpelier, Idaho.

Discover Wyoming Uranium

The Department of the Interior has issued orders reserving about 65,000 acres of public lands in Campbell and Johnson Counties, Wyo., in response to a request of the Atomic Energy Commission to withdraw the land from public entry following the discovery of uranium deposits in that area last fall by geologists of the U. S. Geological Survey. The discovery of carnotite-like uranium mineral was made by J. D. Love, of the Survey while checking anomalies indicated by airborne radiometric reconnaissance undertaken for the AEC by the USGS. It is regarded as important geologically because it may lead to a new field with minable deposits of uranium. The area is in the vicinity of Pumpkin Buttes in northeastern Wyoming.

The USGS, under the sponsorship of the AEC, will explore the reserved area in search for uranium deposits. Lands found to contain no uranium will be released from the withdrawal

order and will again be open for entry. Lands found to contain significant uraniferous deposits are expected to be made available for development and mining by private interests under arrangements with the Commission.

Titanium in Montana

A report received at Missoula, Mont. from the U. S. Bureau of Mines Spokane headquarters states that the richest deposit of titanium in the Northwest is in Montana's Broadwater county and that ore there yields about nine percent titanium oxide. Another deposit of titaniferous magnetite was reported in Teton County which yielded six percent of dioxide and one in Pondera County averages five to eight percent.

King of Tonopah Shaft

Tonopah Development Co. has completed erection of a steel headframe at the King of Tonopah shaft, and is installing a surface plant and mining units in preparation for reopening plans include driving a crosscut 800 or 900 ft from the 300-ft shaft into ground where promising ore showings have been disclosed by diamond drilling. Percy C. Dobson, formerly superintendent of Summit King Mines and Mill in the Sand Spring district, is manager of Tonopah Development Co.

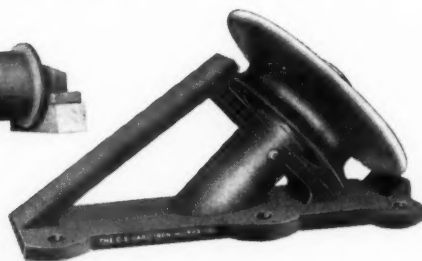
Plan Summer Work

The Bear Basin Mining Co. of Bremerton, Wash., plans extensive new summer activity. One of the plans in their expansive project will be completion of the "cat road" to ease problems of transportation harassing the mining company's officers. A winze will be sunk to 100 ft below present workings and exploratory drifts driven from that point to explore the silver-lead-zinc formation which geological information, now available, indicates will extend even deeper.



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Mexican Silver Output Off

A recent Bank of Mexico report revealed that Mexican silver production has been decreasing during the last eight years. In 1944 over 63,000,000 oz of silver were produced. This dropped to 41,000,000 oz last year. While these decreases are considered "alarming," the country still has world leadership in silver production although it is closely followed by the United States, which produced 40,000,000 oz last year.

Current studies are expected to determine causes for the decrease and also indicate measures to arrest it. The Mexican Mining Chamber has already supplied some information on the situation and maintains that low production of silver has been caused chiefly by the exhaustion of many large silver deposits, and by an almost complete lack of exploration for new deposits.

Get RFC Loan

Idaho Beryllium and Mica Corp. of Caldwell, Idaho, has been granted a government production loan, according to an RFC spokesman. Most of the money is to go for milling machinery to produce beryllium. Output from the company's Moscovite mine at Deary, Idaho, is expected to be chiefly mica "flour." Plans call for milling old dumps before proceeding to the underground deposits.

Increase Iron Ore Output

An estimated 300,000 tons of commercial grade hematite iron ore will be mined at Palisades, Nev., this year, officials of the J. R. Simplot Co. announced recently.

The mine, 60 miles southwest of Elko, Nev., first began production in September of last year, and prior to this winter's bad weather shipped 109,000 tons of ore. The ore is shipped to three major steel mills in Japan.

George McHugh, consulting engineer for the company and manager of the mine at Palisades, said the mine this year will employ an estimated 50 men in the open pit operation and would utilize around 100 trucks and drivers. McHugh also announced the appointment of John Kobe, manager of the Fort Hall phosphate mine, as superintendent of the iron mine. He said Kobe would continue as manager of the Fort Hall operation. The appointment was effective April 1.

Last year, the company built 8 miles of truck access road from the mine to Nevada State Highway No. 20, and re-widened and maintained 18 miles of the highway to the railhead at Palisades. The ores are handled over the Western Pacific and Southern Pacific railroads to Pacific Coast ports.

Denver in September

SEPTEMBER 22 through September 25! These dates mark the period chosen by the Western Division, American Mining Congress to hold its 1952 Metal and Nonmetallic Mineral Mining Convention and Exposition.

Concurrent with the appointment of State Chairmen to the National Program Committee, headed by National Chairman Otto Herres, vice-president, Combined Metal Reduction Co., suggestions began to roll in for papers to be presented at the Convention sessions in the Denver Auditorium. These suggestions will be carefully reviewed when the State Chairmen of the Program Committee meet in Denver next month and from this cross-section of the industry's thinking will be formulated a program calculated to shed light on the most important problems—operating, economic, and political—faced by American men today.

Presidents of mining companies; superintendents of mines, mills and smelters; engineers, shift bosses, electricians, mechanics, machine operators, drill runners, even the man on the muck stick will be able to do a better job when they put into effect the things they will learn from the Convention discussions. Of equal value will be a careful inspection of the hundreds of exhibits in the Show plus the chance to discuss problems at first hand with the manufacturers' technical staffs.

With more mining manufacturers, and suppliers participating than ever before, the Exposition has already outgrown the recently enlarged Denver Auditorium. Indoors and out will be displayed every conceivable kind of surface and underground mining machinery together with milling and metallurgical equipment of all types. More than a third larger than the record-breaking Salt Lake City Show in 1950, the 1952 Exposition will feature every modern aid to the production of metals and minerals.

The schedule for field trips has not yet been arranged, but following the business of the Convention and Exposition, provision will be made for visits to some of the more important and interesting properties in this great western mining area.

Entertainment plans have yet to crystallize but AMC Conventions are noted for the excellent quality and generous quantity of food and fun they provide. Watch Mining Congress Journal for further, more detailed news of the 1952 Metal and Nonmetallic Mineral Mining Convention and Exposition. This biennial affair pays huge dividends to every mining man who takes a share in the Convention, visits the Exposition and turns out for the social events and field trips.

The 1952 model will be the biggest and best ever. Accommodations will be scarce. Those who are planning to attend—and everyone in mining will want to be there—will be well advised to make reservations now. Write, wire or telephone the Denver Convention and Visitors Bureau, 225 West Colfax Ave., Denver, Colo.

To Mine Alaskan Jade

A new company plans extensive mining of jade this summer at Jade Mountain near Kotzebue, Alaska, close to the Arctic Circle. The Imperial Jade Co. first developed a low-cost cutting method, to attack quantities of jade of every known color found there. The jade deposit, located in the remote Arctic "Cosmos Hills" has been known to white men for the past fifty years. The jade rests in lode deposits as well as in boulders weighing up to 100 lb. The boulders have been found to contain the best jade, but previous cutting methods were not profitable. However, the new company believes it has perfected a process which will do the job satisfactorily.

N. M. Miners Plan Meeting

President John A. Wood has announced that the 1953 Annual Convention of the New Mexico Mining Association will be held in Albuquerque January 22, 23 and 24.

Headquarters for the convention will be the Alvarado Hotel.

Arrangements are already in progress to make this the most outstanding meeting ever held by the Association.

"Approximately 750 representatives of the mineral industry from the southwest are expected to attend the meeting," Wood said.

Plan New Operation

George Lippincott of Santa Ana has announced plans for the construction of a new mine-mill and smelting operations in Nye county near Bonne Clare, about 30 miles south of Goldfield, Nev. The Lippincott Lead Co. plans a modern selective flotation mill, and a smelter to reduce lead-silver flotation concentrates and lead ore into bullion form.

Cement Company Grows

Calaveras Cement Co. is believed to be the fastest growing cement firm in the nation, president William Wallace Mein, Jr., told the company's shareholders recently in his annual report.

Announcing that the company's current plant expansion at San Andreas, Calif., is expected to be finished by the middle of 1952, he said that manufacturing efficiency will be greatly increased through modernization of equipment, and cement producing capacity will be expanded to three times that of five years ago.

Largest single item in the current building program is the installation of a 360 ft long fourth kiln with a production capacity of approximately 1,250,000 bbl annually.

Mein revealed that plant output

during 1951 was up ten percent from the previous year, and predicted that by mid-1952 the supply of cement in northern California will be better balanced with demand.

Wyoming Geologists To Meet

The Seventh Annual field conference of the Wyoming Geological Association is slated for August 1, 2, and 3, at Thermopolis, Wyo. Daily field trips will be conducted from there to the southeastern part of the Big Horn Basin.

Fire at Eureka Mine

A fire fed by 300 gal of gasoline destroyed the compressor house at the newly-opened Eureka tungsten mine. The Eureka, operated by Aaron Stromberg, John Kiefer and August Frierish, is nine miles from Boulder, Colo. The operators since opening the mine have improved the tunnel, done some retimbering and are driving to the second ore-shoot in the workings. Damage done by the fire will stop operations for some time.

Open AEC Office in Butte

With the opening of a geological sub-office in Butte, Mont., that city becomes the hub of exploration activities of the Atomic Energy Commission in the northwest. It will handle exploration of mines and prospects in Montana, northwest Wyoming, northern Idaho, Washington and Oregon. Willard L. Reyner will head the office with a staff of five.

Before moving to Butte the office was situated at Spokane, Wash. The headquarters for the office is in Salt Lake City to which many of the activities of the Spokane office were recently moved.

New Park Acquires Claims

New Park Mining Co. is acquiring claims of the Troy Mining Co. in Park City, Utah. The 155,744 acres involved represent the entire assets of the Troy firm, headed by Henry D. Moyle, president. Troy stockholders sometime ago voted to approve the deal.

Acreage involved is one of the few blocks of claims remaining not controlled by New Park in the general area. It also represents the largest acquisition by the firm since it gained voting control early last year of the East Utah Mining Co. The New Park firm has no immediate exploration plans in connection with the purchase but intends to do extensive geological and geophysical exploration work along with diamond drilling to evaluate the possibilities for opening up valuable ore bodies in this area which is highly mineralized.

Sink Exploration Shaft

A 450-ft, two-compartment exploration shaft is being sunk by the Pima Mining Co. at a new copper prospect in the Mineral Hill mining district of Arizona. Contract for the shaft work was let to the Centennial Development Co., Inc. of Eureka, Utah. A steel headframe and necessary surface facilities have been erected and actual sinking started. Geophysical work and diamond drilling preceded the decision to start underground exploration. The prospect is located about a mile east of the Eagle-Picher Mining and Smelting Co.'s San Xavier Mine. E. D. Spaulding, Tucson, Ariz., is in charge for the Pima Mining Co. Harold B. Spencer is president of Centennial Development Co.

Find Silver Vein

Discovered a short time ago in the Mohawk mine, at Argentite in the Silver Peak district of Nevada, a silver vein is developing into one of the richest ore bodies in southwest Nevada. Exposed by a drift more than 200 ft long, the vein is the full width of a six-ft tunnel and 12 ft wide in a crosscut.

Ore is treated at the Black Mammoth mill, recently improved and reactivated. The Argentite, Mohawk and Nivloc properties near Silver Peak were acquired a few months ago by Avery Brundage of Chicago and rehabilitated under the supervision of E. R. Hines.

Form Mining Association

Organization of the Mineral Resource Association of central Idaho was effected recently. Howard Sims was elected chairman and Joseph L. Ausich, secretary-treasurer. The organization is an outgrowth of meetings held to take steps toward stockpiling ore for the convenience of small mine operations.

Lead At Grizzly Mine

A strike of galena ore in the lower levels of the Grizzly mine, west of Silver Plume, Colo., has been reported by Ellis Lupton, owner of the mine. His was the first mine in the west to receive a grant from the Defense Minerals Administration. Lupton said the discovery could not have been made without the \$40,000 grant given him six months ago, which he matched with an equal sum.

Exploration work has been going on in the mine for two years. The strike was made early in February after a 1400-ft tunnel had been driven to the vein. Further exploration along the strike is now being carried on.

Open Wyoming Copper Deposit

Harry Ferguson and Patrick W. Dinnen will develop a major low grade copper ore deposit 22 miles west of Cheyenne, Wyo. A production of 1000 tons a day is expected from the operation which will be on state owned land. This is the site of the old Copper King mine, opened in 1883, but later abandoned.

Poncha Springs Fluorspar Mine

Reynolds Mining Corp. has purchased the Poncha Springs fluorspar mine in Colorado from Fluorspar, Inc., according to Walter L. Rice, president of the Reynolds firm. A subsidiary of Reynolds Metals Co., the mining company has started production of acid-grade fluorspar at the mine. The mine will supply a substantial part of the fluorspar needed by Reynolds to make synthetic cryolite, which is needed to make aluminum from alumina.

The property included approximate-

ly 22 mining claims and a partly completed flotation plant. Reynolds has completed the latter and plans further additions.

Big New Open Pit Mine

On its new Van Stone mine in Stevens County, Wash., the American Smelting and Refining Co. is stripping an area 400 ft wide and 1400 ft long for open pit mining of a zinc-lead ore body for which they are now building a milling plant. About 100 men are employed.

Transfer Mine Holdings

In the annual report of the Nancy Lee Mines, Inc., it is reported that management is planning to transfer the company's Pine Creek, Idaho, holdings to a new corporation, the New Era Mines, for deep development. The report states that a long term royalty contract has been submitted by an operator for the development of this property.

With the Defense Agencies

(Continued from page 57)

855,000 tons of crude ore and 295,000 tons of ore concentrates will move over these roads annually.

Coal Export Controls Terminated

Allocation and licensing of coal exports from the United States, required since November 1, 1951, terminated on April 1. The Commerce Department and the Mutual Security Agency said that lower estimates of coal requirements from the principal importing countries, and the easing of shipping shortages and port congestion in the United States were the main reasons for lifting the controls. Export licenses will still be required for coke.

Coal Construction Projects Enumerated

Defense Solid Fuels Administrator Connor has made public a list of 44 coal mine construction projects that have been authorized by DSFA since October 1951. Estimated to cost a total of \$28 million, these projects are spread throughout the principal coal producing States. The projects are primarily for the expansion of metallurgical coal to meet defense needs. They range from expansion and improvement of existing facilities to the development of new mines. The work includes construction of tipplers for washing and cleaning coal, coal conveying systems, pumping stations, and other mine facilities.

CMP Easing

Supplies of controlled materials are becoming less tight according to recent pronouncements of DPA and NPA officials. Some have expressed the view that it may be possible to practically remove such key metals as aluminum and most forms of steel from CMP by early next year. Copper supplies remain in a relatively tight supply situation, these officials observe, but they point to the expansion programs under way and declare that even in the case of this metal larger allocations to users may become possible in the near future.

Allocations for the last two quarters of this year have been increased pretty much among all users. Even soft goods producers are finding that they can readily obtain key metals that were short not over three months ago. The stretching out of the military armament program is given as one reason for the increasing availability of these materials.

Defense officials are giving mining expansion projects and the production of mining equipment increasingly favorable treatment.

The defense mobilization program has been rolling along the past few weeks without any one being named to take the place of Charles E. Wilson, who resigned over the steel dispute. The Washington rumor mill predicts that DPA Administrator Manly Fleischmann may take over the mobilization post—it likewise has it that no one mobilizer will be named and that there will be one boss for production and another for stabilization. Anyone's guess is likely to be a good one at this time!



Detachable

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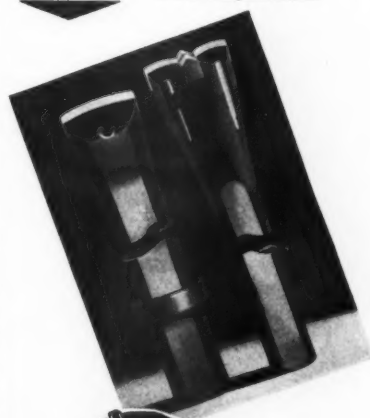
Chisel or 4-point—gauge sizes: 1 1/2" to 4". Booklet gives details.

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ALL TYPES OF HOLLOW DRILL STEEL
ACCESSORIES FOR PNEUMATIC DRILLS

Manufacturers Forum

Easy-To-Measure Cable

If you want twenty ft of Bronco 60 Certified portable cord or cable, you have only to count off ten "Bronco's" and cut.

This new convenience is the result of Western Insulated Wire Co.'s practice of branding their neoprene-jacket-

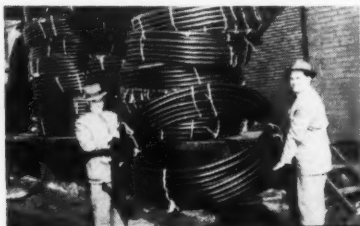


eted cord and cable with full identifying data at precise two-ft intervals. The legend impressed into the jacket includes the name "Bronco 60 Neoprene Certified," the type, number of conductors, size, rated voltage, and "P116BM"—flameproof registration number of the U. S. and Pennsylvania Bureaus of Mines.

Bronco 60 Certified is a portable cable with jacket certified to contain not less than 60 percent by weight of new neoprene.

Prevents Pipe Corrosion

A complete range of flexible and rigid plastic pipe for every piping need is now being manufactured by



The Plastex Pipe and Extrusion Co., 402 Mt. Vernon Ave., Columbus, Ohio. The firm has been engaged in the custom extrusion of plastics since 1939 and will continue to carry on this business in addition to making plastic pipe.

Plastex Corrosion Proof Pipe has many applications in mining opera-

tions, and general piping of pure or corrosive liquids and gases. Its makers claim positive resistance against rust, rot and electrolytic corrosion and a smooth interior surface which provides maximum transmission of up to 40 percent more liquid than ordinary pipe. It is extremely light weight, weighing about one-tenth that of equivalent metal pipe. Installations above or below ground are quickly accomplished without special tools and connections are easily made with cemented plastic fittings. Plastex Pipe comes in a complete range of standard pipe sizes from 1/2 in. up to 6 in. Coils are made up to 400 ft long and straight lengths, 25 ft long.

Control Bin Levels

Two additions to their line of "Tel-level" Automatic, Bin-Level Control Switches are announced by Stephens-



Adamson Mfg. Co. in a new bulletin recently released.

The explosion-proof Tellevel is designed and approved by the Underwriter's Laboratory for operation in hazardous areas where explosive vapors and dust occur.

Where materials, such as coal, stone and ore with lump sizes above 3/4 in. are being discharged to bins, the heavy-duty unit is recommended. It is furnished with a sturdy steel housing protecting the switch mechanism and the standard plastic float ball is replaced by a steel cone. A rubber cup at the base of the housing forms a dust and moisture proof seal to protect the switch mechanism.

Write Stephens-Adamson Mfg. Co. at Aurora, Ill.; Los Angeles, Calif., or Belleville, Ontario, for your copy of bulletin 11-0.

Improved Scrapers

Caterpillar announces a pair of new scrapers for use with the Cat DW10 Tractor. With this choice, the equipment user can match his rig more closely to job requirements.

The new No. 10 Scraper is somewhat lighter than before, with capacity of seven cu yd struck and nine cu yd heaped. For heavier applications where a pusher is more important, the



No. 15 Scraper has a capacity of 10 cu yd struck and 13 cu yd heaped.

Top extensions (sideboards) may be attached to either scraper for increased capacity where the material does not exceed a weight of 2800 lb per cu yd.

Both scrapers have a flat, double-bottom bowl of high-tensile steel and a "stinger" blade with reversible cutting edge is standard equipment. Cable rigging provides for positive loading and ejection. The wheels turn on tapered roller bearings. Air brakes are synchronized with the tractor brakes.

Complete information is available from Caterpillar Tractor Co., Peoria 8, Ill., or Caterpillar Dealers throughout the free world.

Improve Frother

A new synthetic flotation frother which Dow Chemical Co. claims will yield better frothing characteristics and promises improved metallurgy for the mining industry has been developed.

The product is called Dowfroth 250. It is a synthetic, water soluble material developed in response to the growing need for a powerful, non-collecting frothing agent. The material can easily and accurately be regulated as a water solution, and some is returned to the flotation circuit in water recovery systems. It is particularly applicable to selective flotation since it shows little or no collecting power,

and allows independent regulation of frother and collector.

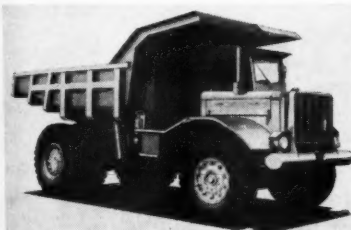
Because it requires little or no conditioning time, Dowfroth 250 lends itself to stage addition and, although the froth produced is unusually lively, it breaks down readily in the froth launders and pump boxes.

It is easy to handle and store. Evaporation losses are negligible when stored in open vessels and outdoor storage is satisfactory in all climates because of its low freezing point.

Produce New Truck

Kenworth Motor Truck Corp. of Seattle is beginning full scale production of its new heavy-duty, end-dump Earth-Mover, Model 801, truck.

Exhaustive tests under actual operating conditions are claimed to prove the Kenworth Earth-Mover to



be rugged, powerful and dependable.

Payload capacity is 30,000 lb and it is over-tired for safety, flotation and high tire life. The truck's body capacity, struck measure, is 9.9 cu yd, with heaped load at 11.9 cu yd.

The truck has a full anti-friction bearing mounted, power assisted steering gear, simplified controls, minimum turning radius and wide axle track to insure ease of handling, maximum maneuverability and high stability. The offset cab provides exceptional visibility for the driver, both fore and aft. Special consideration has been given to simplicity and ease of access for servicing and maintenance.

Derrail Protects Workers

Availability of a portable derrail unit for temporary derailing service and safety is announced by the Nolan Co., Bowerston, Ohio.

The Nolan Derrail is recommended for use wherever workers may be endangered by wild cars, switching cars, or uncontrolled and unsuspected car movements in rail yards, spurs, etc. It is particularly adapted to mine use as protection at room necks, entries, etc.

Derrailment is accomplished in either direction, on right or left hand rail. No spiking is necessary as a wedge construction securely locks the derrails to the rail. Each derrail is complete with flag.

Full details and prices can be secured from the manufacturer.

Develop Flexible Hose

The American Ventilating Hose Co. of 100 Park Avenue, New York 17, N. Y., announces the development of a light weight, extremely flexible hose type made with neoprene compounds



and laminated nylon chaffer duck. For pressure and vacuum services, this wire-reinforced Flexaust type has been designed for operations involving abrasive dust collection, heavy flexing and gravity feeds, etc. Hose sizes range from 1½ in. to 24 in., inside diameter.

New Six-cu yd Excavator

Bucyrus-Erie Co. has announced a new six-cu yd Ward-Leonard electric excavator, known as the Model 150B.

The shovel's lower boom section is rigidly connected to the A-frame as an integral part of the machine. Wide-spread boom feet eliminate sway braces. The upper boom section is pin-connected to the lower and suspended from the A-frame by fixed length bridge strands. The dipper handle is tubular and free to rotate in a cylindrical saddle block which contains rubber cushions to absorb shock loads. Single-part doubled hoist ropes



are attached with an equalizing sheave to each side of the dipper. The conventional dipper bail is not used.

Crowd and retract are accomplished by twin ropes, and crowd machinery is at the forward end of the revolving frame. The dual twin hoist automatically applies hoisting effort where needed on the dipper lip and teeth to cut through local obstructions in the bank. The lighter weight of the tubular handle and a favorable relationship between hoist and crowding power are intended to give a maximum of digging effort to the shovel dipper. The shovel is fully convertible to a dragline. Drag and hoist functions are operated by independent electric motors and difficulties of field conversion have been reduced to a minimum.

— Announcements —

T. O. Liebscher was named president of Le Roi Co. at a recent board of directors meeting. At the same time G. J. Hamm was appointed secretary-treasurer, C. W. Decker, assistant secretary and J. R. Gavigan, assistant treasurer.

The McNally-Pittsburg Mfg. Corp. announces the addition of Colin P. Holmes, English coal preparation expert, to their engineering advisory staff.

Holmes, former head of the coal preparation activities of the Birtley Co., Ltd., Newcastle, England, will serve the McNally-Pittsburg organization in an advisory capacity as preparation consultant on flotation equipment and other coal preparation activities. Much of his broad experience has been gained in the Continental as well as English coal production circles.



CATALOGS AND BULLETINS

VAPORTIGHT FIXTURES. Appleton Electric Co., 1710 Wellington Ave., Chicago 13, Ill. The new Appleton "V-51" series convertible vaportight lighting fixture is fully described and illustrated for pendant, ceiling or bracket mounting, with or without reflectors and guards. Wattages, weights and dimensional data are included in this folder, Bulletin 5-A.

PUMP MOTORS. Electric Machinery Mfg. Co., Minneapolis 13, Minn. E-M Synchronizer No. 33, latest in a series of quarterly publications, deals with large pumps and the application of a-c motors to them. Articles cover applications of large a-c motors to centrifugal pumps, cooling water pumping in the petroleum industry, "power house" insulation treatment, and the use of the variable speed Magnetic Drive on pumping applications. Also contains helpful engineering information, charts and diagrams, plus photographs of many of the pumping installations in the country.

STAINLESS AND HIGH ALLOY PRODUCTS. Electric Steel Foundry Company, 2141 N. W. 25th Avenue, Portland 10, Ore. ESCO Stainless and High Alloy Products for the Process Industries, No. 175, is an enlarged more comprehensive version of ESCO's original process equipment catalog. Special equipment for the chemical, mining, construction and petroleum industries is shown grouped into categories of corrosion, abrasion, and heat resistant characteristics. The mechanical properties of ESCO Alloys are charted and discussed. A very complete breakdown of the types of corrosion problems is offered and discussed with regard to the various suitable alloys used to combat them. Detailed specification charts for fittings, flanges, valves, pipe and tubing have a prominent position, and ten pages are given to weight, area, hardness, and standard conversion tables.

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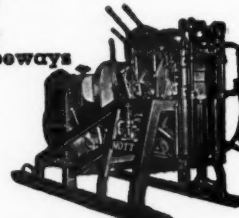
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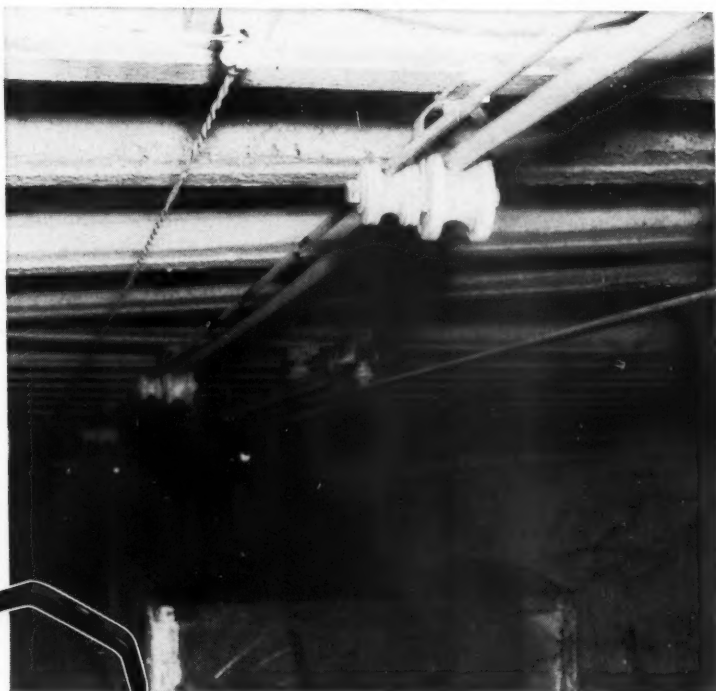
USE SAME FITTINGS FOR

Copper

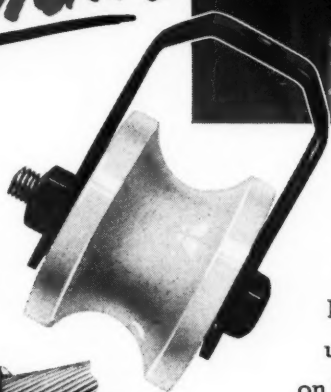
AND

Aluminum

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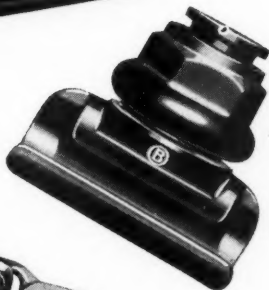
O-B Type-C
Feeder Wire
Insulator



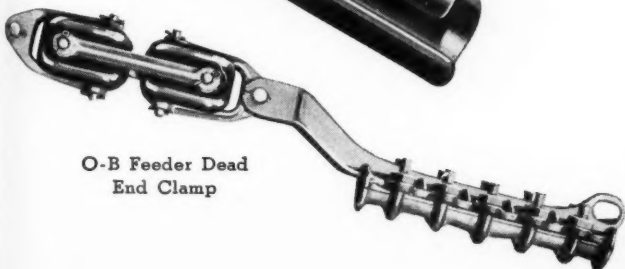
O-B Combination
Feeder-Trolley
Clamp Without
Boss



O-B Bulldog
Feeder Sling



O-B Feeder Dead
End Clamp



Adding aluminum cable to your feeder system is easy so far as hanging is concerned. You can keep on with your present feeder hanging method, using O-B Trolley and Feeder materials already on hand. Many of the O-B Feeder Cable fittings will hold the aluminum sizes you'll be using to carry your distribution system into new sections. Fittings can also be supplied for large (1,600,000 CM) aluminum cable.

A representative group of O-B fittings for copper or aluminum cable is shown here. You'll find others in the O-B No. 27 Catalog — and of course, your O-B representative can tell you many things about current feeder hanging methods. Let him help work out a system for your feeder circuit extensions!

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every year—
promotes greater
underground safety

Teamwork plays a major role in realizing peak production in today's modern mining methods. And because teamwork relies completely on the availability of *every man*, bulb burn-outs may deal a crippling blow to operations.

Successful mine operators everywhere are finding the answer in the reserve protection of the Edison double filament bulb. A burned-out filament doesn't mean a lost shift for the miner and a short crew for the foreman. A turn of the switch transfers the power of the unfailing Edison battery to the second filament—restores continued, brilliant illumination. Teamwork is maintained, underground safety is assured. And because there is only *one bulb*, located in the center of the headpiece, Edison light has the advantage of maximum reflector area.

You'll find it profitable to investigate the production-safety benefits of the Edison double filament bulb.



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